INDEX NUMBER

JOURNAL

of the

INDIAN MEDICAL ASSOCIATION

VOLUME 34 NUMBER 12 CALCUTTA JUNE 16, 1960

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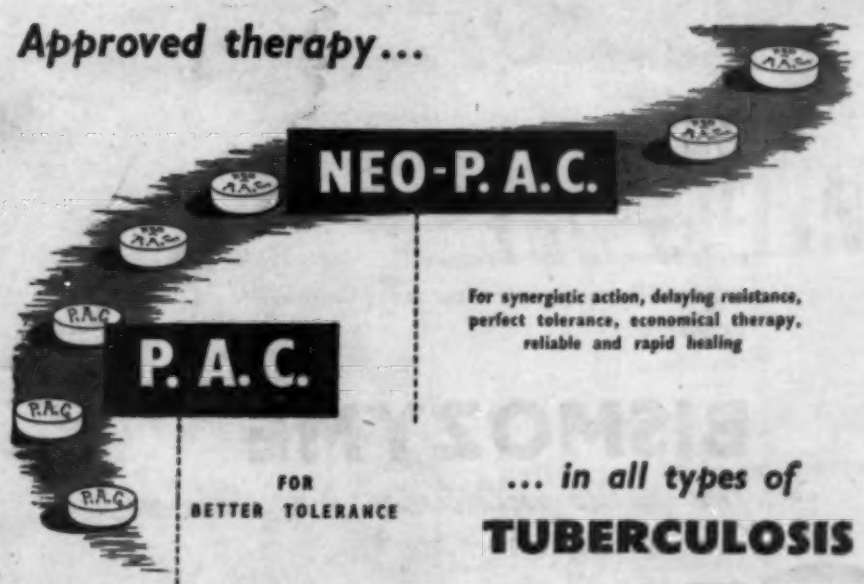
Approved therapy...



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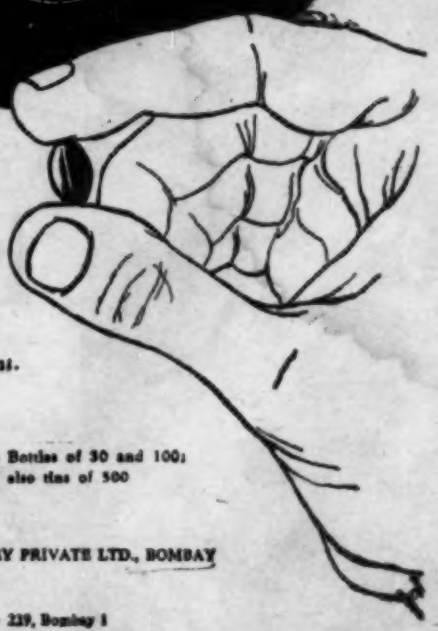

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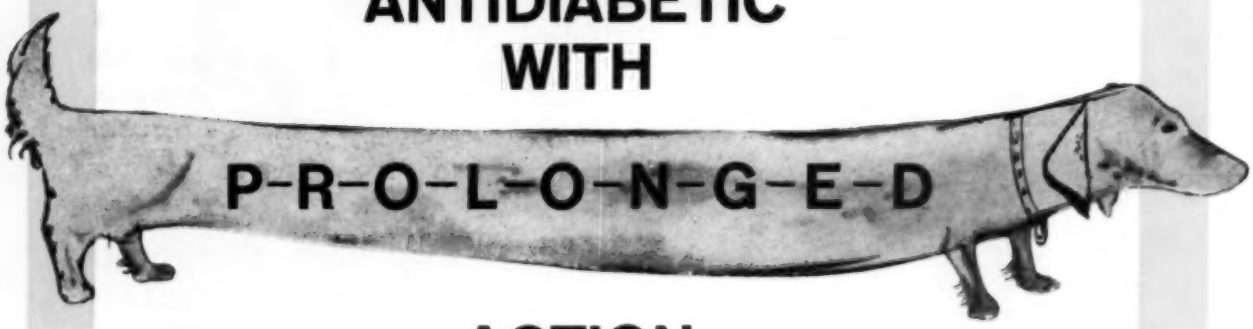

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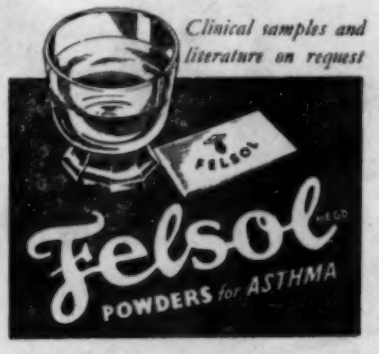

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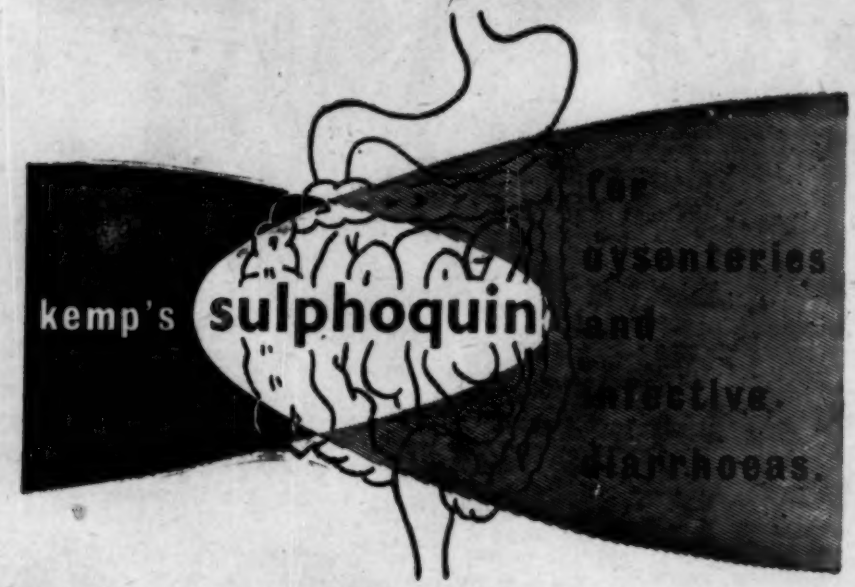

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DEX/P/14

THE BIAS AGAINST ALL THINGS FACTORY-MADE

"To be biased in the study of any scientific subject is to wear a cork leg in the march to progress."

HORDER

People are conservative. They like what they are used to. Sometimes this protects them from cheap and nasty innovations. Sometimes it leads them to a blind resistance to change. The great discoveries of Lister and Semmelweiss and Simpson all met with unreasoning opposition even from scientists.

A notable example of unreasoning conservatism is the prejudice that many people have against all things factory-made. No valid explanation can be offered, especially when one considers that most synthetically manufactured drugs and hormones available today are an improvement on the natural forms; in fact, most of them are cheaper, more effective, more easily standardized and without many of the untoward reactions observed in their 'natural' counterparts. Most illnesses today are treated with such drugs — and with excellent results!

Yet on a subject as vital as Nutrition, we find that there are people, even doctors, who are guided more by old beliefs than scientifically established fact. Hydrogenated fats suffer greatly from such beliefs. It is believed, for instance, that they are inferior to animal fats when used as a cooking medium. Yet numerous workers in this and other countries have concluded that hydrogenated fats are as good as animal fats for cooking, if not better.

Research studies in Europe and the US show that the basic energy and food value of hydrogenated oils is the same as that of the oils from which they are prepared. In the case of DALDA, the leading brand of vanaspati, this means primarily groundnut and til oils — both of which have a long record of excellence as a cooking medium.

These researches also indicate that, as a source of fat, hydrogenated oils like DALDA are equal to butter. Dr. Aykroyd, the former Director of Nutrition Research Laboratories, Coonoor, says: 'Vanaspati is a wholesome food and there is no objection from the nutritional standpoint to an increase in its consumption.'

In the USA, H. J. Deuel has found that products like DALDA, which are made of hydrogenated oils (95% of the oil in DALDA is partially hydrogenated), are digested and absorbed just as well as butter fat. Langworthy, also in the United States, has proved that the digestibility coefficients of vegetable oils hardened up to a melting point as high as 45° C are as good in humans as those of butter fat. And the melting point of DALDA is never above 37° C — which coincides optimally with body temperature.

DALDA has moreover one great advantage over the oils from which it is made. It is an excellent source of vitamins. Seven hundred International Units of Vitamin A, nearly one quarter of an adult's daily requirement, go into every ounce. And it is well known how deficient the Indian diet is in this vitamin. Besides this, 56 IU of Vitamin D are also added. In normal cooking, these vitamins are well retained, though if subjected to great heat for a long time, they will be lost from DALDA as from any other food.

There is a final point worth remembering. A great deal of medical research has been conducted on the subject of the causation of atherosclerosis and coronary and cerebral thrombosis. Excessive fat intake and faulty fat metabolism have been blamed by some people as factors causing these conditions in later life. Nobody yet knows how true this is. What we do know is that cholesterol when raised in a person's blood (serum) and when raised for a long period of time is definitely incriminated in the pathogenesis of atherosclerosis. Thyroid disorders, diabetes etc are diseases of the human which are characterized by raised serum cholesterol levels in the blood. Atherosclerosis is a very frequent accompanying complication of such diseases.

Much more knowledge is needed, and we welcome, therefore, the Government's announcement that the Indian Council of Medical Research is making investigations to try and establish the facts.

DALDA has been used in India for nearly 30 years. Today it is a part of Indian cooking, accepted both as an excellent fat to cook with and as a good food in its own right. And not the least of the reasons for its success is that it is factory-made, a modern product untouched by hand in manufacture, hygienically packed and made to a strict specification.

DL/P.7-23

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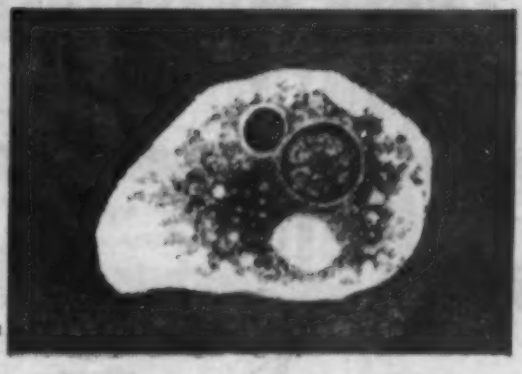

"Frequently an unrecognized hepatitis coexists with intestinal amebiasis."[2]

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2 Zavala, D. C., and Hamilton, H. E. : *Ann. Int. Med., 36 : 110*, Jan., 1952
3 Conan, N. J. : *Am. Jour. Med., 6 : 309*, Mar., 1949

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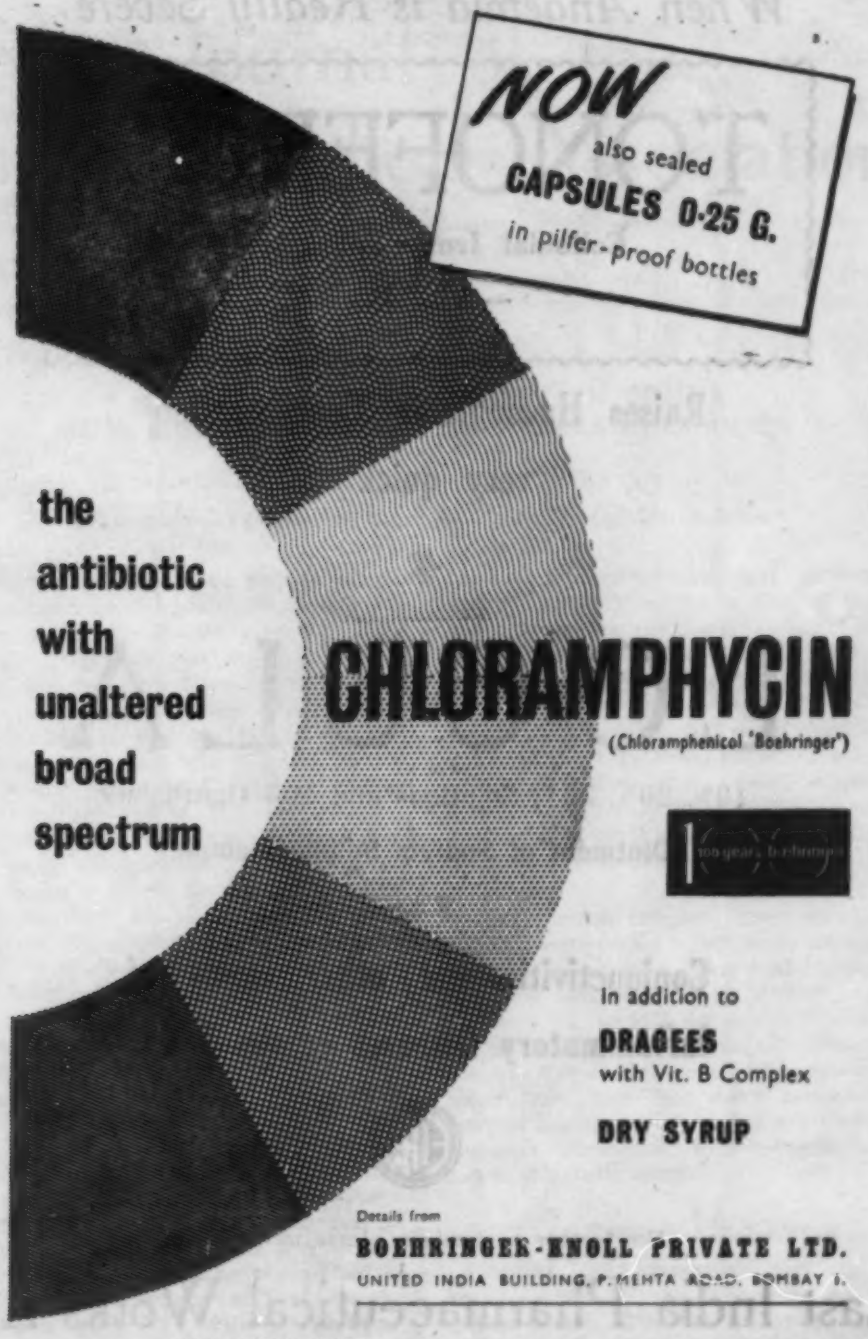

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Journal of the Indian Medical Association

VOLUME 34
NUMBER 12

PUBLISHED TWICE A MONTH
EDITOR—P. K. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.)

CALCUTTA
JUNE 16, 1960

ORIGINAL ARTICLES

SOME OBSERVATIONS ON HEPATIC COMA WITH SPECIAL REFERENCE TO AMMONIA METABOLISM

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For a century and a half and perhaps longer, hepatic coma has been recognised as an ominous complication of hepatic disease that frequently ends in death. Since its first description, little progress has been made regarding the physiologic and pathologic changes that take place in this condition. Within the past few years, however, more and more effort has been directed to this problem. Despite tremendous efforts of various workers little is as yet known about the metabolic relationship existing between the liver and the brain, and about the metabolic disturbances in severe liver disease or due to the presence of portal collateral circulation. It seems probable that until these metabolic relationships are understood more clearly, no intelligible concept of the pathogenesis of hepatic coma will be forthcoming. But the diffuse nature of cerebral disturbances in hepatic coma involving basal ganglia, midbrain and pyramidal tract leading to bizarre symptoms strongly suggests that the cause of such disturbances is of metabolic origin. There is some circulating toxic factor affecting these areas and this factor must be considered critically.

Ammonia intoxication has been suggested as a causative factor in hepatic coma from the observation that characteristic neurological and electroencephalographic changes may be precipitated in certain patients with cirrhosis of liver by the administration of ammonium salts by mouth or urea intravenously, or by giving proteins through diet. Ammonia can be derived from all these substances, and neurological deterioration is usually accompanied by a rise in the level of ammonia in the peripheral venous blood. It is agreed by many workers that the peripheral venous blood ammonium level and the intensity of the coma could not be correlated. It has also been explained that peripheral venous blood ammonium levels are unlikely to reflect accurately the intracellular ammonium in the brain. Alternatively, it has been suggested that besides ammonia there may be some other unidentified toxic factors from the gastrointestinal tract coming with the portal blood.

The extreme complex nature of hepatic coma and the controversial report about ammonia intoxication as a causative factor made further supportive work necessary. In the present investigation, 20 cases of hepatic coma have been carefully studied with special reference to ammonia metabolism. In 8 cases both peripheral venous and arterial blood ammonium have been estimated and an attempt has been made to find out whether or not ammonia intoxication is a probable aetiological factor of hepatic coma.

MATERIAL AND METHODS

Fasting blood ammonium level was estimated in 50 normal subjects who gave no history of recent illness. The subjects were mainly the students of K. G. Medical College, Lucknow and some of our colleagues.

Cases for the study of ammonia metabolism in liver diseases were patients admitted to Gandhi Memorial and Associated Hospitals of K. G. Medical College, Lucknow. They were mainly suffering from cirrhosis of the liver, infective hepatitis, and neoplasm of the liver with neurological complication (hepatic coma).

After recording the name, age, sex, occupation and chief complaint of the patient, a thorough history was taken carefully with special reference to liver disease. Special attention was given regarding the symptomatology of the syndrome of hepatic failure. In taking the history of a case of hepatic coma, attempt was made to find out the underlying disease and the precipitating factor of coma. The neurological status was graded as follows:

Grade 0 ...	Normal	
Grade 1 ...	Minor disorder of consciousness	Impending coma
Grade 2 ...	Gross disorder of consciousness and of motor systems	
Grade 3 ...	Coma	

Mental changes which included apathy, confusion, inappropriate behaviour and excitement were regarded as more sensitive indicators. The common motor signs were flapping tremor of the outstretched hands, altered muscle tone, tendon reflexes, ankle clonus and flexor plantar response. In comatose patients plantar response was extensor.

Special investigation—Besides doing routine examination of blood, urine, C.S.F. and screening of the chest, liver function was assessed by doing a group of liver function tests. In 8 cases needle biopsy of the liver was done.

Blood ammonium estimation—Blood ammonium was estimated by the method described by Seligson and Seligson (1951). Before doing the blood samples a standard curve was prepared by diffusing known strengths of ammonia solution (5-30 μg) running in different samples along with a blank of reboiled distilled water. Following this method blood ammonium was estimated from antecubital vein in 20 cases of hepatic coma and from the brachial artery in 8 cases of hepatic coma.

Observations

Blood ammonium estimation in normal healthy people—Fasting peripheral venous blood ammonium was estimated in 50 normal healthy people. The mean fasting peripheral venous blood ammonium in this series is 1·1 (with standard deviation 0·2) μg. per c.c. of blood. In 10 cases arterial blood ammonium from brachial artery was estimated. The difference between arterial and peripheral venous blood ammonium (A-V) in these 10 normal cases was '0'.

Blood ammonium estimation in liver disease without neurological symptoms (hepatic coma)—In 40 cases of cirrhosis of the liver without neurological symptoms the mean fasting peripheral venous blood ammonium was 1·6 μg. per c.c. of blood which was above normal value (1·1 $\pm$ 0·2 μg. per c.c.) The mean fasting peripheral venous blood ammonium level in 20 cases of virus hepatitis with deranged liver function tests was 1·8 μg. per c.c. of blood. The mean fasting peripheral venous blood ammonium level in 20 cases of neoplasm of the liver was 1·5 μg. per c.c. of blood.

Results and Discussion

In the present series (Table 1) 20 cases of hepatic coma were studied carefully. Early diagnosis was made more readily by clinical picture of personality changes, flapping tremor on sustained posture, increased tendon reflexes with extrapyramidal type of rigidity and usually flexor plantar reflexes (Adams and Foley, 1953). Some cases were admitted in semicomatose and comatose condition. They showed diminished tendon reflexes with plantar extensor. Out of 20 cases, 16 (80 per cent) had flapping tremor which was one of the important early diagnostic clinical signs of impending coma. In 10 cases (50 per cent) there were foetor hepaticus present, of which 9 (90 per cent) died in the hospital, indicating thereby that it is of bad prognostic significance. In 15 cases (75 per cent) there was clinical evidence of jaundice, but there was no correlation between the severity of the jaundice and the intensity of the coma.

Two important factors in patients developing hepatic coma were considered—firstly, the underlying disease of the patient, and secondly the precipitating factor of coma. All these patients suffered from either chronic or acute hepatic disorder. Ten (50 per cent) out of 20 cases were suffering from cirrhosis of the liver, 4 cases (20 per cent) infective hepatitis, 4 cases (20 per cent) malignant liver and 2 cases (10 per cent) cholangiohepatitis. The precipitating factor of coma was found in the present series in the following order of frequency: (a) infection—7 cases (35 per cent), (b) shock—3 cases (15 per cent), both circulatory and mental shock, (c) haematemesis—3 cases (15 per cent), (d) after giving morphine—1 case (5 per cent), outside hospital, (e) Alcohol—1 case (5 per cent), and (f) rapid tapping—1 case (5 per cent). In 4 cases (20 per cent) the precipitating factor could not be found out. Infection is thus the most

TABLE 1—SHOWING ANALYSIS OF THE CASES OF HEPATIC COMA

Case No.	Name, sex, age (in years)	Underlying disease	Precipitating factor	Date	Mental status in grades	Blood ammonium level in μg. per c.c.	
						Peripheral venous	Arterial
1	S.D., F., 20	Cirrhosis liver	Haematemesis	17- 2-56	1	2·1	—
				19- 2-56	2	1·9	—
				20- 2-56	2	2·3	—
				21- 2-56	3	2·6	—
2	S.P., 40	Secondary carcinoma liver	Infection	13- 2-56	2	2·7	—
				15- 2-56	1	2·5	—
				17- 2-56	0	1·5	—
				22- 2-56	0	1·3	—
3	B.D., M., 40	Infective hepatitis	—	4- 3-56	1	2·0	—
				6- 3-56	1	2·1	—
				11- 3-56	0	1·6	—
				14- 3-56	0	1·7	—
				16- 3-56	0	1·6	—
				18- 3-56	0	1·6	—
4	S.D., F., 30	Cirrhosis liver	Infection	12- 4-56	1	2·5	—
				13- 4-56	2	2·7	—
				14- 4-56	2	2·9	—
				15- 4-56	1	2·7	—
5	B.B., M., 45	Malignant liver	Infection	18- 5-56	1	2·5	—
				20- 5-56	2	2·7	—
				22- 5-56	3	2·2	—
				23- 5-56	3	2·6	—
				24- 5-56	3	2·9	—
6	M.S., M., 50	Cirrhosis liver	Rapid tapping	18- 5-56	1	2·5	—
				20- 5-56	0	2·7	—
				22- 5-56	3	2·0	—
				23- 5-56	3	2·6	—
				24- 5-56	3	2·9	—
7	R.N., M., 40	Malignant liver	Morphine	11- 7-56	2	2·5	—
				12- 7-56	2	2·7	—
				13- 7-56	3	2·7	—
8	R.B., M., 71	Cholangio hepatitis	Infection	16- 7-56	1	2·7	—
				17- 7-56	2	2·9	—
				18- 7-56	2	2·9	—
				20- 7-56	0	2·6	—
9	J.J., F., 40	Infective hepatitis	Diarrhoea and shock	18- 7-56	2	2·8	—
				19- 7-56	3	3·0	—
10	R.D., F., 26	Cholangio hepatitis	Infective peritonitis	11- 7-56	1	2·5	—
				13- 7-56	2	1·9	—
				14- 7-56	3	2·2	—
11	T.K., 40	Cirrhosis liver	Circulatory failure and shock	17- 8-56	1	2·5	—
				19- 8-56	2	2·8	—
				20- 8-56	3	2·9	—
				22- 8-56	3	3·0	—
				23- 8-56	3	3·1	—

TABLE 1—*Contd.*

Case No.	Name, sex, age (in years)	Underlying disease	Precipitating factor	Date	Mental status in grades	Blood ammonium level in μg. per c.c.	
						Peripheral venous	Arterial
12	C.N., F., 25	Infective hepatitis	—	22- 9-56	2	2·4	3·2
				23- 9-56	3	3·0	3·4
				24- 9-56	3	2·7	3·4
13	M.D., F., 50	Infective hepatitis	Infection	9-11-56	2	1·4	3·1
				11-11-56	2	1·5	3·2
				12-11-56	1	1·6	2·9
				13-11-56	0	1·3	1·9
14	J.P., M., 30	Cirrhosis liver	Alcohol	9-11-57	1	1·4	2·7
				11-11-57	1	1·6	2·7
				12-11-57	0	1·6	1·8
15	D.A., M., 25	Cirrhosis liver	Haematemesis	29- 1-57	1	2·2	2·9
				30- 1-57	1	2·3	2·7
				4- 2-57	0	1·7	1·9
16	J.D., F., 52	Cirrhosis liver	Infection	12- 2-57	1	2·2	2·7
				15- 2-57	2	2·4	3·1
				18- 2-57	2	2·0	3·0
				26- 2-57	0	1·6	1·8
17	J.R., F., 25	Cirrhosis liver	—	28- 2-57	1	2·5	2·7
				29- 2-57	2	1·9	3·0
				1- 3-57	1	1·7	2·8
				4- 3-57	0	1·6	1·9
18	M.D., M., 30	Cirrhosis liver	Severe mental shock	9- 3-57	3	2·9	3·6
				10- 3-57	3	3·0	3·9
				11- 3-57	3	2·9	4·0
				12- 3-57	3	3·1	4·0
				13- 3-57	3	3·1	4·2
				14- 3-57	3	3·3	4·2
19	M.H., M., 50	Cirrhosis liver	Infection of lung	4- 3-57	3	3·0	3·7
				5- 3-57	3	2·1	3·7
				6- 3-57	2	2·6	3·2
				7- 3-57	2	2·0	3·1
				8- 3-57	3	2·4	3·8
				9- 3-57	3	2·7	3·9
				10- 3-57	3	2·8	3·9
20	S.S., M., 22	Diffuse hepatic fibrosis	Haematemesis	14- 9-56	1	2·1	—
				15- 9-56	3	1·7	—
				17- 9-56	3	1·9	—
				20- 9-56	3	2·5	—
				26- 9-56	2	2·0	—
				4-10-56	1	1·9	—
				15-10-56	0	1·7	—
				30-10-56	0	1·7	—

common precipitating cause of hepatic coma in the present series.

Liver function tests were done by standard methods, and they were found deranged in all the cases (Table 1). The neurological status was classified into 4 grades according to the intensity of the coma, and peripheral venous and arterial blood ammonium levels were determined for correlation in each sampling with these neurological grades.

Blood ammonium level and neurological status—Blood ammonium was estimated of samples from both peripheral vein and brachial artery by the method of Seligson and Seligson (1951).

Peripheral venous blood ammonium level—In this series of 20 cases of hepatic coma, 87 estimations of peripheral venous blood ammonium were made, and the values were correlated with neurological grades at the time of sampling (*vide* Table 1). Higher blood ammonium level was found in cases of liver disease with neurological symptoms as opposed to cases of liver disease without neurological symptoms. Though there was high peripheral venous blood ammonium level in most of these cases, yet there was often wide fluctuation in individual cases, (Cases 13, 14 and 20), and the correlation of peripheral venous blood ammonium level with neurological grades was never exact.

Arterial blood ammonium level—34 estimations of arterial blood ammonium by puncture of the brachial artery in 8 cases of hepatic coma were made, and the values correlated with the neurological status of the patients. The difference between venous and arterial blood ammonium level was noted and compared with the 10 normal cases where the difference was almost zero. In these 8 cases blood ammonium level was above 2·5 μg. per c.c. and blood ammonium level could be correlated with the neurological grades. There was marked arteriovenous (A-V) difference of blood ammonium level in these cases as opposed to zero in 10 normal subjects.

The incrimination of ammonia intoxication in hepatic coma is suggested by the observation that the characteristic neurological and E.E.G. changes may be precipitated in certain patients with cirrhosis of a liver by the administration of ammonium salts by mouth or urea intravenously, or by giving proteins through diet. McDermott and Adams (1954) reported the appearance of abnormal neurological signs shown by a patient with cirrhosis of the liver and Eck fistula. They could correlate the blood ammonium level with the neurological status. Traeger *et al* (1954) reported that in some cases of cirrhosis of the liver who received ammonia resins developed drowsiness, apathy, confusion and a coarse flapping tremor. The clinical condition engendered by the administration of these resins was indistinguishable from spontaneous hepatic coma occurring in patients with cirrhosis. Though it was suggested that the toxic symptoms might be related to the elevated blood ammonium, the correlation however was insufficient for these authors to consider that a causal relationship had been firmly established between an elevated blood ammonium and neurological symptoms.

Sherlock *et al* (1955) estimated peripheral venous blood ammonium in cases of hepatic coma and they tried to correlate the values with the neurological status. Higher blood ammonium levels were found in patients with either present or past neurological changes. Those with blood ammonium level above 2 μg. per c.c. had either impending or manifest hepatic coma at the time of sampling. However, in 10 per cent of estimation in each of the grades 1, 2, and 3 were within normal range. In individual patients the correlation of the blood ammonium level with fluctuation in the neurological status was variable but never exact. They demonstrated the unsuitability of the blood ammonium estimation in diagnosis, prognosis and assessment during terminal hepatic failure.

Sherlock *et al* (1955) put forward another alternative hypothesis. They postulated that on theoretical grounds it might be possible for intracellular intoxication with ammonium to occur in the brain when normal peripheral venous blood ammonium values were found by current unsatisfactory technique. Alternatively, blood ammonium level may reflect only the amount of portal venous blood reaching the systemic circulation without being metabolised by the liver. Portal blood might contain some unknown toxic factors. According to these authors relation of blood ammonium level to hepatic coma might thus be similar to the relation of blood urea level to clinical uraemia; in both cases correlation can be established but in either is the relationship causal.

It has been postulated that cerebral deprivation of ketoglutaric acid due to its combination with ammonia to form glutamic acid, is a possible explanation of the metabolic defect in the brain. This hypothesis is compatible with the high uptake of ammonia by the brain in hepatic coma and the elevated levels of glutamine in peripheral blood and C.S. fluid due to subsequent amidation of glutamic acid. However, several factors including the increased amount of keto acids in the peripheral blood conflict with this theory and have

prompted the suggestion that deficiency of l-keto-glutaric acid is behind the blood brain barrier, despite higher than normal levels in the peripheral blood.

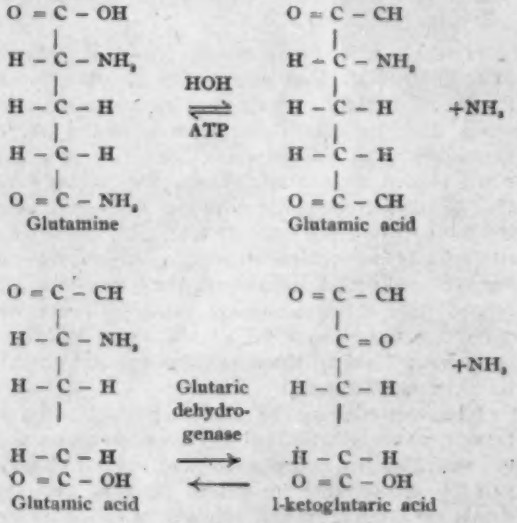
Bessman and Bessman (1955) presented a hypothesis for chemical pathology of hepatic coma that ammonia intoxication is the cause of hepatic coma. They supported the view of McDermott *et al* (1954) that blood ammonium level could be correlated with the intensity of the clinical improvement of coma if the different techniques followed by these workers are taken into consideration. Bessman and Bessman (1953) found that there was practically very little (almost '0') difference between arterial and peripheral venous blood ammonium in normal people (Sherlock *et al*, 1955). But in liver disease, specially in hepatic coma, arterial concentration of free ammonium was much higher than cerebral and peripheral venous blood ammonium. This led them to the conclusion that free blood ammonium is converted by the brain and muscle to a bound form which is no longer detectable by the method employed. The brain takes up ammonia when the blood level rises above normal (above 1 μg. per c.c.). The uptake of ammonia by the brain is roughly proportional to the arterial concentration. These authors could correlate arterial concentration of ammonium with neurological grades in all cases.

The data presented here (Table 1) showed that though the peripheral venous blood ammonium levels were usually higher in hepatic coma than in uncomplicated liver disease, yet the values could not be correlated to the severity of the clinical state and sometimes fell within the normal range even with deep coma (Sherlock *et al*, 1955). In 3 cases (Cases 13, 14 and 20) estimation of peripheral venous blood ammonium in each of the grades 1, 2 and 3, were within the normal range. The result presented here confirmed the recently reported observation by Bessman *et al* (1955) that arterial concentration of free ammonia correlate far better with the state of consciousness or intensity of hepatic coma than the peripheral venous blood ammonium. 34 estimations in 8 cases of hepatic coma were made from arterial blood and blood ammonium levels were correlated with the neurological grades (Table 1). In all these cases arterial blood ammonium levels were above 2·5 μg. per c.c., though peripheral blood ammonium levels were sometimes within normal range.

TABLE 2—SHOWING MEAN ARTERIAL AND PERIPHERAL VENOUS BLOOD AMMONIUM LEVEL (IN μG. PER C.C.) IN HEPATIC COMA

Authors	No. of observations	Arterial blood ammonium level	Venous blood ammonium level	A—V
Bessman and Bessman (1955)	15	2·32	1·88	0·44
Present work (1956-57)	34	3·09	2·20	0·89

The marked positive 'A-V' difference of free ammonium in hepatic coma cases shown in the data reported here support the observation made by Bessman and Bessman (1955) that the free blood ammonium is converted by brain and muscle to a bound form which is no longer detectable by the method employed. The utilisation of free ammonium by brain in hepatic coma suggests an hypothesis concerning the pathologic chemistry of this syndrome. The fact that ammonia is taken up by the brain and that it is not the physical equilibrium with brain tissue which would be the case if the arteriovenous difference were zero (as it is in normal patients), indicates that ammonia is being utilised in some chemical reaction. Of the many reactions utilising ammonia in the body, two are of significance in the brain, viz., glutamine synthesis and the reversal of glutamate oxidation of l-ketoglutarate.



It is clear from the data presented here that arterial blood ammonium is well correlated with the neurological grades of hepatic coma as opposed to peripheral venous blood ammonium. The constant high blood ammonium level (above 2·5 μg. per c.c.) in 34 estimations of 8 cases of hepatic coma confirm that ammonia is one of the causa-

tive factors of hepatic coma. The marked arteriovenous difference (A-V) of blood ammonium in hepatic coma as opposed to '0' in normal cases further confirm that there is some intermediary chemical reaction in the brain and muscle tissue by which free blood ammonium is converted into a bound form which is no longer detectable in the peripheral venous blood and therefore showing wide fluctuations in different neurological grades.

Summary and Conclusion

87 estimations of peripheral venous blood ammonium in 20 cases of hepatic coma failed to correlate blood ammonium level with neurological grades and clinical intensity of coma. Sometimes peripheral venous blood ammonium level fell within normal range even with deep coma. 34 estimations of arterial blood ammonium in 8 cases of hepatic coma showed that arterial blood ammonium level could be correlated far better with the neurological grades and clinical intensity of coma. Arterial blood ammonium in hepatic coma was never below 2·5 μg. in each estimation. The marked arteriovenous difference (A-V) of blood ammonium in hepatic coma as opposed to '0' in normal cases suggested that probably brain and muscle take up free ammonium by some intermediary chemical reaction, when arterial ammonium rises above normal value and ammonia intoxication is one of the probable causative factors of hepatic coma.

Acknowledgment

My thanks are due to Dr. B. Mukerji, Director, Central Drug Research Institute, Lucknow, and to Dr. C. R. Krishnamurtti, Senior Scientific Officer, for giving me facilities to standardise the technique of blood ammonium estimation under their guidance.

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PROTEIN METABOLISM IN MARASMIC CHILDREN

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Marasmus in infants and young children due to lack of protein food and other factors such as chronic infections and congenital abnormalities is prevalent in this country.

Figures are not available for the level of excretion of total nitrogen, amino-nitrogen and ammonia nitrogen in urines of normal as well as marasmic infants of Indian origin in the age group of 0-24 months. With a view to find out their ranges in the normal child and/or any deviation in marasmic ones, the following conventional biochemical methods have been undertaken.

Material

Observation was carried out at the in-patients and out-patients departments and the baby clinic of the Institute of Child Health, Calcutta, from 1st March 1957 to 28th February 1959. This was carried out in both the normal control and marasmic infants and children of age group 0 to 24 months of both sexes.

Methods

The total nitrogen in the urine was estimated by Microkjeldahl's method with the following modifications :

1 ml. of urine was digested for 30 minutes, after it had become light green in colour by gentle boiling with 2 g. of K_2SO_4 and $CuSO_4$ mixture (20 : 1) and 2 ml. of concentrated H_2SO_4.

After initial cooling the whole mixture was made up to 50 ml. volume. 10 ml. of the diluted mixture was then distilled in Markham's distillation apparatus, with 10 ml. of 40 per cent NaOH for 5 to 10 minutes until 8 to 10 ml. of the distillate was collected. The ammonia liberated was collected in 2 per cent boric acid solution containing the indicator. Nitrogen evolved was determined by back titration of the boric acid solution with standard N/50 H_2SO_4.

The result obtained by this modification was very satisfactory as estimated by its reproducibility and recovery of the added known amount of nitrogen. The results were within 3 per cent of the theoretical expected amounts.

The *free amino-nitrogen* was determined by formol titration method of Sorensen (1954) quoted

by Hawk *et al* (1954) with some modifications. 5 ml. of urine was treated with 0·1 ml. of 0·5 per cent alcoholic phenolphthalein solution and 0·2 g. $BaCl_2$. Saturated solution of Ba $(OH)_2$ was added drop by drop until a pink colour developed, and an excess of 0·5 ml. of S.S.Ba$(OH)_2$ was added and kept for 15 minutes. The pH was adjusted to 7 and the whole mixture was made up to 10 ml. volume. After filtration 4 ml. of the filtrate was treated with 2 ml. of neutral formaldehyde and titration was done with N/50 NaOH. Final pH of the solution was 9.

The *ammonia nitrogen* was estimated by aeration method of Van Slyke and Cullen (1954) quoted by Hawk *et al* (1954). It was determined in 1 ml. of urine. The qualitative chromatographic patterns of free amino acids in the urine were studied by one—and bi-dimensional paper chromatography. To get best reproducible comparative results chromatograms were plotted according to equimolecular concentration of amino-nitrogen (50 Y) rather than of equal volume of urine. The one-dimensional paper chromatograms were developed in phenol saturated with water plus NH_3 and NaCN tanks. The bi-dimensional paper chromatograms were first developed in phenol saturated with 6·3 per cent sodium citrate and 3·7 per cent K_2PO_4 and then in N-butanol : acetic acid : water (4 : 1 : 1). Various other solvents were also tried but the solvent systems mentioned above gave quite satisfactory reproducible separation of amino acids studied.

The *serum amino acids* were also studied by the same solvent systems of bi-dimensional paper chromatography after being extracted by the method of Gordon and Nardy (1954).

The quantitative estimations of the *free amino acids* in the *serum* and *urine* were carried out by the buffer-filter paper chromatographic technique of McFarren and Miller (1952).

Results and Discussion

There are very few references in the literature relating to the blood and urine amino acid studies in marasmic infants and children, though extensive work has been done in other aspects of the syndrome. During the last few years some reports describing the blood and urinary amino acids studied by different techniques in normal and protein malnourished cases have been published (*Nutr. Rev.*, 1959 ; Westall *et al*, 1958 ; Schreier, 1955 ; Dent, 1954).

The break up of the cases examined in this study are shown in Table 1.

Table 1—Showing Analysis of the Cases

Control cases	...	Male	...	14	17
		Female	...	3	
Test cases	...	Male	...	12	15
		Female	...	3	

Table 2 shows the number of cases, sex distribution, weight and height of the cases in various age groups.

Table 2—Showing Sex, Weight and Height of Infants Studied

Age groups (months)	Total No. of cases	Sex	Number	Weight range (average) in kg.	Range of height (length) in cm.
0-6	Control 5	Male	4	4·04—5·72 (4·46)	54·0—56·0
		Female	1		
	Test 3	Male	2	2·55—3·18 (2·89)	28·0—56·2
		Female	1		
7-12	Control 6	Male	5	3·80—8·00 (6·72)	58·2—71·7
		Female	1		
	Test 9	Male	8	2·00—7·23 (3·78)	55·7—70·0
		Female	1		
13-24	Control 6	Male	5	7·50—12·00 (9·85)	70·0—75·0
		Female	1		
	Test 3	Male	2	4·59—8·90 (6·10)	56·2—70·0
		Female	1		

The range of body weight in the control cases of age-groups 0 to 6 months was 4·04 to 5·72 kg. and that in the test cases varied between 2·55 to 3·18 kg. In the 7 to 12 months age group the body weight in the control cases varied between 3·80 to 8·00 kg., and in the test cases 2·00 to 7·23 kg. Children of 13 to 24 months age-group weighed 7·50 to 12·00 kg. in the control series and 4·59 to 8·90 kg. in the test series. Compared with the control series the infants and children of the test series were grossly underweight.

The ranges of height (length) of the control series in the three age groups (0-6 months, 7-12 months, and 13-24 months) were 54·0 to 56·0 cm., 58·2 to 71·7 cm. and 70·0 to 75·0 cm. respectively. These in the test series were 28·0 to 56·2 cm., 55·7 to 70·0 cm. and 56·2 to 70·0 cm. respectively. Except in one infant of the test series, where body length was 28·0 cm. the linear growth of the infants and childen was very little affected in the age groups of 0-6 months and 7-12 months. Retar-

dation in linear growth was noted in the 13-24 months age-group.

The total nitrogen (TN), amino nitrogen (NH_2-N), and ammonia nitrogen (NH_3-N), in the urines of both the control and test cases in different age groups are shown in Table 3.

TABLE 3—SHOWING TOTAL NITROGEN, AMINO NITROGEN AND AMMONIA NITROGEN IN DIFFERENT AGE GROUPS

Age group (months)	Cases	Total No.	T-N in mg. % range (average)	NH_2-N in mg. % range (average)	NH_3-N in mg. % range (average)
0-6	Control	5	213·0—505·0 (410·2)	15·5—40·2 (25·20)	21·0—45·0 (33·50)
	Test	3	428·0—763·0 (595·7)	39·0—68·3 (53·65)	35·0—68·0 (51·50)
7-12	Control	6	280·0—819·0 (417·8)	16·5—97·0 (37·47)	27·0—87·0 (30·50)
	Test	9	216·0—866·0 (461·7)	19·8—158·2 (55·92)	12·0—130·0 (47·50)
13-24	Control	6	178·0—540·0 (381·5)	27·6—28·3 (27·05)	19·0—22·0 (20·50)
	Test	3	238·0—885·5 (464·3)	47·5—109·2 (62·00)	42·0—47·2 (47·00)

The total nitrogen (TN) in the urine represented the non-protein nitrogen as proteins were not detected in the urine by using protein precipitants (10 per cent trichloracetic acid) and tests for albumin in the urine. In the 0-6 months age group the range of excretion in the urine of the test cases was 428·0 to 763·0 mg. per cent. In the 7-12 months age group the ranges in the test and control series were 216·0 to 866·0 mg. per cent and 280·0 to 819·0 mg. per cent respectively. Cases of 13-24 months age group showed the ranges of 238·0 to 885·5 mg. per cent in the test group and 178·0 to 540 mg. per cent in the control group. These values, as well as average values, show increased loss of total nitrogen in the urine of marasmic cases of all age groups (Table 3).

The data of amino nitrogen (NH_2-N) in the urines of test and control cases (Table 3) in the three age groups also show considerable excretion of amino nitrogen in the urines of marasmic cases.

The ammonia nitrogen (NH_3-N) values in the urine are also considerably raised in the test cases (Table 3).

The qualitative chromatograms showing the comparative patterns of urinary amino acids in the test and control cases (Table 4) also show increased excretion of amino acids in the test group.

TABLE 4—SHOWING COMPARATIVE PATTERNS OF URINARY AMINO ACIDS

Amino acids examined	No. of cases: Control cases	No. of cases: Test cases	Intensity**: Heavy — Control cases	Heavy — Test cases	Moderate — Control cases	Moderate — Test cases	Faint — Control cases	Faint — Test cases
Glycine	9	11	2	6	4	2	3	3
Alanine	4	9	—	—	2	4	2	5
Tyrosine	6	6	—	1	1	1	5	4
Glutamic acid	5	3	1	—	2	2	2	1
Serine	4	3	1	—	2	1	1	2
*Valine	1	5	—	—	1	1	—	4
*Threonine	1	1	—	1	1	—	—	—
Aspartic acid	1	2	—	—	—	1	1	1
*Lysine	—	1	—	—	—	—	—	1

* Essential amino acids.
** Chromatographic patterns of free amino acids in the urine have been computed by comparing the intensity of colour and size of the spots against a standard source of light. These have been graded arbitrarily as heavy, moderate or faint.

Quantitative estimations of amino acids in the urines by buffered-filter-paper chromatographic technique (Table 5) reveal significant increased excretion of glycine, alanine, threonine and other amino acids studied except serine, which shows a reduction to half the normal value.

TABLE 5—SHOWING URINARY AMINO ACIDS (IN TERMS OF AMINO-NITROGEN IN MG. %)

Amino acids studied	Test cases 10: Minimum value	Test cases 10: Maximum value	Test cases 10: Average	Control cases 6: Minimum value	Control cases 6: Maximum value	Control cases 6: Average
Aspartic acid ...	0·03	0·25	0·14	0·05	0·20	0·11
Glutamic acid ...	0·05	3·50	1·37	0·05	3·80	1·00
Serine ...	0·20	0·90	0·44	0·50	1·20	0·85
Glycine ...	1·25	7·40	5·49	2·50	6·90	4·73
*Threonine ...	0·10	*0·60	0·32	0·10	0·25	0·16
Alanine ...	0·70	14·40	6·60	0·35	5·00	3·00
*Lysine ...	—	—	—	0·14	0·17	0·15
*Valine ...	—	—	—	0·31	0·33	0·31
Total ...			14·36			10·31

* Essential amino acids.

Thus the increased aminoaciduria is not the result of increased output of any particular amino acid but is due to increased excretion of several amino acids.

The free amino acids of the serum studied both qualitatively and quantitatively by paper chromatographic techniques (Table 6 and 7 respectively) in the control and test cases present interesting findings.

TABLE 6—SHOWING COMPARATIVE PATTERNS OF SERUM AMINO ACIDS

Amino acids studied	No. of cases		Intensity**					
			Heavy		Moderate		Faint	
	Control cases	Test cases	Control cases	Test cases	Control cases	Test cases	Control cases	Test cases
Cystine	2	1	—	—	—	1	2	—
Aspartic acid	2	3	—	—	—	1	2	2
Glutamic acid	6	5	—	1	3	3	3	1
Serine	6	7	1	—	3	7	2	—
Glycine	7	8	3	2	2	4	2	2
*Threonine	5	4	—	—	—	1	5	3
Alanine	7	8	1	5	5	3	1	—
Tyrosine	1	5	—	—	—	—	1	5
*Valine	6	6	—	1	4	5	2	—
*Lysine	2	5	—	—	—	1	2	4
*Methionine	1	3	—	—	—	—	1	3
*Phenylalanine	1	1	—	—	—	—	1	1
*Isoleucine and Leucine	5	6	1	4	3	1	1	1

* Essential amino acids.
** See bottom of Table 4.

Qualitative chromatogram (Table 6) shows almost all the amino acids studied in similar patterns in the serum of both the control and the marasmic cases except tyrosine, lysine and methionine. The slight differences in the concentration of the amino acids in the serum were due possibly to individual variations or variations in the degree of clinical conditions of the patients.

Quantitative estimation of free amino acids in the serum (Table 7) shows no increase in the serum amino acid concentrations in marasmic group. However an imbalance between the amino acids can be noticed in the test cases.

TABLE 7—SHOWING SERUM AMINO ACIDS (IN TERMS OF AMINO-NITROGEN IN MG. %)

Amino acids studied	Test cases 5			Control cases 5		
	Minimum value	Maximum value	Average	Minimum value	Maximum value	Average
Glycine ...	0·3	0·6	0·35	0·2	0·4	0·33
Alanine ...	0·5	0·8	0·58	0·4	0·7	0·55
*Lysine ...	0·2	0·6	0·26	0·1	0·4	0·28
*Valine ...	0·2	0·3	0·23	0·2	0·3	0·27
Glutamic acid ...	0·04	0·08	0·06	0·06	0·1	0·09

* Essential amino acids.

The following are the causes for increased excretion of amino acids (Gairdner, 1954):

1. Overflow from high plasma levels of amino acids, due to increased alimentary absorption ('alimentary aminoaciduria'),

2. Overflow from high plasma levels of amino acids due to (a) decreased protein anabolism or increased protein catabolism by the body tissues, (b) decreased anabolism by the liver or increased catabolism by the liver and (3) renal leak with normal or decreased plasma levels of amino acids due to defective tubular reabsorption mechanism.

The absence of raised levels of free amino acids in the blood of marasmic cases indicates that possibly they have no derangement of the liver functions with respect to amino acid metabolism.

Little is known with certainty about the mechanism of amino acid reabsorption in the kidney tubules. Recently Doolan *et al* (1955) have carried out amino acid clearance studies in human subjects and have reported that more than 98 per cent of filtered amino acids are reabsorbed, with the exception of glycine and histidine. Somewhat less of the filtered loads of these two, 96 per cent and 94 per cent respectively are returned to the body. They also found that the excretion of isoleucine, leucine, valine, proline, alanine, methionine, arginine, tryptophan, phenylalanine and lysine (all included in group A) remained small despite significant elevation in the concentration in plasma. But histidine, serine, glycine, tyrosine, cystine, and threonine (included in group B) are excreted in larger amounts as their concentrations in the plasma are increased. These data do not clearly define the causes of aminoaciduria but suggest that neither all amino acids are resorbed to the same extent, nor the transport mechanism is same for each of them. Glycine is reported to be toxic to the reabsorption transfer mechanism

for the amino acids of group B (Doolan *et al*, 1955). One might suspect in some cases of aminoaciduria, that if it is present in unusual amounts in the tubular urine, the group B amino acids will be excreted in amounts greater than the group A amino acids. Our data do not show any selective influence of glycine on the amino acids excreted. On the other hand, a generalised type of aminoaciduria is noted in marasmic cases.

Kidneys have been reported to be deranged functionally and histologically in malnutrition cases such as kwashiorkor, famine oedema, etc. (Trowell *et al*, 1954 ; *Nutrition Rev.*, 1959).

The aminoaciduria in our cases may be due to derangement in the kidney functions with particular reference to amino acid handlings. Possibly the nature and extent of kidney pathology in marasmic cases, is so gross that selective handling of amino acids is not possible and so a generalised type of aminoaciduria is noted.

Summary

Partitioning of the urinary nitrogen and qualitative and quantitative studies of free amino acids in blood and urine have been carried out in both normal control and marasmic infants and children in the age group of 0 to 24 months.

Biochemical data reveal considerable loss of total nitrogen, amino nitrogen and ammonia nitrogen in the urines of the test cases. Absence of raised levels of amino acids in the blood imply derangement in the function of the kidneys, particularly in amino acid handlings.

Acknowledgment

My thanks are due to Dr. K. C. Chaudhuri, Professor of Paediatrics and Director of the Institute, under whose guidance the present work was carried out and to Dr. J. Nag Chaudhuri, for helpful advice and criticism.

The work was assisted by a Research Grant by the Indian Medical Association (Central).

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SWELLINGS OF THE THYROID

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Goitre is not very common in South India. In this article, it is proposed to study and review 127 cases of thyroid swellings, who were admitted in Government Stanley Hospital, Madras, during the period 1955-59. This teaching institution caters to a section of patients that come from South India and may be said to represent a true family picture of the incidence of goitre in this area.

Most of the cases sought admission directly to the general surgical side. A few cases of thyrotoxicosis were first admitted on the medical side and subsequently referred to the surgeon.

For purposes of study, the cases are classified into three categories depending on their final disposal : (a) cases that were treated medically or did not require any surgery, namely physiological goitre, small colloid goitre, mild thyrotoxicosis and lymphadenoid goitre (22 cases) ; (b) cases that were operated (79 cases) and (c) cases that refused surgery (26 cases).

Classification—A study of the varieties of classification of thyroid swellings, made by different authors often leaves one perplexed. Some of these are based on aetiological, and others on clinicopathological grounds. Further, where the various types are really stages in an evercharging progress of the disease process, the pathology makes this confusion inevitable. For purposes of clarity, we propose to adopt a simple clinicopathological classification after Joll (1951).

The type incidence shown in Table 1 is at variance with those reported by other authors : According to Means (U.S.A.) (1948) the incidence of primary thyrotoxicosis is 50 per cent that of simple goitre. The incidence of lymphadenoid goitre varies from 5-2 per cent in other reported series.

Sex and age incidence—The sex incidence in this series (Table 1) is also at variance with that in the series reported by other workers. The incidence of thyrotoxicosis has been reported

variously as males: females=1:4, 1:4·4, 1:7, 1:8·2 by Means, (1948), Witzig (1948), Iverson (1948) and Rundle (1941) respectively. In our series the proportion was 1:1·3. As regards malignant thyroid, the incidence in the present series is 1:1, whereas in Joll's series it is 1:9 and in Pemberton's (1938) it is 1:1·8.

As regards age incidence, most authors are of the view that the peak incidence of thyrotoxicosis is between 30-40 years whereas in our series, it was about 25 years. The age incidence of malignant disease agreed with that of the other series.

TABLE I—SHOWING SEX, AGE AND TYPE INCIDENCE

Types	Males	Females	Average age incidence (in yrs.)	Type incidence (per cent)
Physiological and parenchymatous goitre ...	—	6	19	4·7
Colloid goitre ...	11	35	33	36
Nodular goitre ...	6	17	35	18
Primary thyrotoxicosis	13	17	25	21·6
Malignant thyroid ...	9	9	55	14
Lymphadenoid goitre	1	3	35	3·1
Total ...	40	87		

INVESTIGATIONS

Before discussing each type individually a general review of the investigations done is given below. All the cases were investigated to decide whether they were toxic or nontoxic. In addition to the history and clinical features, the following investigations were carried out:

(i) Taking of weight at weekly intervals.
(ii) Recording of sleeping pulse rate.
(iii) Study of the electrocardiogram.
(iv) Taking skiagram of the chest and of the neck for evidence of tracheal deviation and calcification.
(v) Haematological investigations.
(vi) Estimation of serum cholesterol level value.
(vii) Determination of basal metabolic rate.

TYPES OF GOITRE

A brief survey of the individual types is given below:

Physiological and parenchymatous goitre—This is seen in adolescents and is either due to increased demand for thyroxine due to increased metabolic activity or due to the endocrines not being able to find their relative balance in a period of sudden excessive activity. Clinically there is diffuse smooth enlargement of the glands, with no toxic symptoms. As it is only a temporary phase, no active treatment is indicated, except haematinics and nourishing and balanced diet.

Colloid goitre—It is essentially a retention goitre, the acini being distended with colloid. After a period of increased activity due to increased growth, colloid collects in the acini, when the demand ceases. The gland is enlarged and soft but irregular in shape. On section, it contains honey-combed spaces, with gelatinous material oozing out. Microscopically, we notice flattened cells lining a distended acinus.

In cases of small colloid goitres, where the swelling was minimal and smooth, patients were advised to come for frequent check-up. Some of these improved spontaneously. In other cases, partial or hemithyroidectomy was done to relieve, either pressure on the trachea, oesophagus or irritation of the recurrent laryngeal nerve or to prevent malignant or toxic or haematogenous degeneration. In some cases, the indication was for cosmetic reasons.

Nodular goitre—This is a further stage of colloid goitre and is probably due to long continued and excessive demands on the thyroid gland. The surface of the gland is irregular and asymmetrical. It is due to persistence of hyperplasia in some areas and involution in the rest of the gland. Skiagrams may reveal areas of patchy calcification. These nodules may be single or multiple. In some cases areas of haematogenous or cystic degeneration may be seen on section. Some of these nodules have a fine capsule and can be shelled out without much difficulty.

The solitary nodule (called adenoma by some authors) has a definite capsule and usually causes displacement of the trachea to the opposite side. In rare cases, it may increase to the size of an orange, specially, when it undergoes haemorrhagic degeneration. It is more common in females. Malignant degeneration is stated to occur in 5·9 per cent of single nodular goitres. We had occasion to see only one case in this series. As stated under colloid goitre, treatment is indicated either for cosmetic reasons or for fear of toxic, malignant and haemorrhagic degeneration. Another indication is pressure symptoms like dysphagia, dyspnoea or hoarseness of voice.

Enucleation is advised for the solitary nodule, and partial thyroidectomy for multinodular goitre. The technique is relatively simple and the results are gratifying.

Primary thyrotoxicosis—This is relatively more common, its incidence being 21·6 per cent in this series. Aetiology of this condition is not yet clear. Heredity is supposed to play a part as is evident from increased incidence in certain families. In our series, a definite history of psychic trauma was not always available. The various signs and symptoms with their percentage incidence is given in Table 2.

TABLE 2—SHOWING PERCENTAGE INCIDENCE OF SIGNS AND SYMPTOMS

Signs and symptoms	Incidence (per cent)
Eye signs, including exophthalmos ...	33
Loss of weight	40
Cardiovascular signs (tachycardia etc.) ...	50
Neurotic manifestations	50
Swelling	85
Pressure symptoms (dysphagia, dyspnoea) ...	25
Increased basal metabolic rate (more than +15)	88
Decreased serum cholesterol	72
Menstrual irregularities	80
Retrosternal extension	0

All the cases were first investigated for presence of any septic focus which was removed, if possible. Mild toxic cases, where the trigger mechanism was some demestic worry or emotional upset, were relieved by suitable medical treatment and change of environment. Most of the patients felt better after an adequate period of hospitalisation, and were not submitted for surgery. The rest of the cases were submitted for sufgery, after adequate preparation. A few of these cases needed a prolonged stay in hospital before they were fit for surgery. They were put on gradually increasing doses of methyl thiouracil 50-100 mg., three times daily or 5-10 mg. of neomercazole till the B.M.R. settled down to normal. Then Lugol's iodine was given three times daily for two weeks before the date of operation. No toxic symptoms were met with, except a few cases of microcytic anaemia. Subtotal thyroidectomy was done in every case. Most of these cases were operated under general endotracheal anaesthesia. The postoperative complications met with were severe tracheitis, mild infection in the wound, serum collection and adherent painful scar. In one or two cases, mild post-operative thyrotoxic crisis was met with which responded well to symptomatic measures. No case of postoperative haemorrhage, tetany or vocal cord paralysis was met with in this series.

There were no recurrent or secondary toxic goitres in our series.

Malignant goitre—The incidence between males and females was equal in our series. There was no history of any previous irradiation in any of these cases. Eighty-three per cent of these cases were carcinomas, while 17 per cent were papillary cystadenocarcinomas. Some were too advanced for any treatment, whereas in the rest, partial excision followed by deep x-ray therapy was done. The final results were not happy. One case of papillary cystadenocarcinoma came with secondary deposit in the right parotid gland. Inspite of thorough sectioning, the thyroid nodule failed to reveal any trace of malignancy.

Lymphadenoid goitre (Hashimoto's disease)—Four cases of lymphadenoid goitre were seen in this series, the incidence being 3·1 per cent. The incidence reported by others is comparatively low. The average age incidence was 35 years. Clinically, there was a generalised, firm and symmetrical swelling of the neck of varying duration, lasting from a few months to a few years. The chief complaints were a sense of discomfort about the neck and moderate hoarseness of voice. An increase in weight and a feeling of lassitude were the common manifestations of mild myxoedema. Due to the varying proportion of fibrous tissue in the gland, palpation at times suggested malignancy. The B.M.R. was low and serum cholesterol raised. The precipitin test with thyroglobulin as the antigen was not done. After the operation, the final diagnosis was made by the pathologist. In one case, hemithyroidectomy was done, as that side was suggestive of malignant change. The other cases were thought to be nodular goitres. All the patients received thyroid extract medication post-operatively and felt better thereafter.

Other types like Riedel's thyroiditis and subthyroiditis were not met with in this series.

DISCUSSION

The number of cases in this series though small, when compared with others, is reported as no previous attempt has been made to study the incidence and characteristics of goitre in South India.

As already reported, the percentage incidence of the various types is at variance with the figures

quoted from U. K. and U.S.A. The commonest type seen here is colloid goitre which is followed closely by primary thyrotoxicosis.

In our experience, the treatment of thyrotoxicosis has been satisfactory. In the course of a few years, radio-active iodine would probably supplant the surgical treatment of this condition (Bailey and Love, 1956). We have no comment to make on this subject, as we had no oportunity to use radioactive iodine. We found that given sufficient time and therapy, surgery is safe for the average toxic case.

As regards Hashimoto's goitre the difficulty is to make a pre-operative diagnosis. Even though clinically one may suspect it, only the precipitin test and protein bound iodine estimations would confirm the diagnosis. Excellent results have been claimed with thyroid extract medication in this condition. All our cases were diagnosed postoperatively by the pathologist though we suspected one on clinical grounds pre-operatively. Further this condition is not so rare as is imagined.

Summary

A series of 127 cases of thyroid swelling are reviewed. Their relative incidence and the symptoms are briefly noted. The modern trends in treatment are briefly discussed.

Acnowledgment

My thanks are due to the Dean, Government Stanley Hospital, Madras for permission to utilise records of the institution. My thanks are also due to the pathology department of the hospital for help.

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DRUG TREATMENT OF INFECTIVE HEPATITIS

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Though jaundice of epidemic type has been known since the time of Socrates (quoted by Cockayne, 1912) no specific treatment for the disease is as yet known. Ascorbic acid, B-complex group of vitamins, broad spectrum antibiotics and corticosteroids, all have their advocates and conflicting observations have been made by workers. In the present work an attempt has been made to correlate the role of various drugs in infective hepatitis to the clinical features, serum bilirium level and thymol turbidity test.

Materials and Methods

The cases were collected at random during the epidemic of infective hepatitis in 1958-59 from the out-patients department of the Patna Medical College Hospital. In all 88 cases were observed and after their symptoms, signs, serum bilirium and thymol turbidity were recorded, they were put on the following treatment regime by rotation :

Group I—Vitamin B_{12} 100 μg. by I. M. route daily—18 cases.

Group II—Aureomycin 1 g. and bidecorticyl 20 mg. daily in four equally divided oral doses—18 cases.

Group III—Aureomycin 1 g. daily in four equally divided oral doses—18 cases.

Group IV—Bidecorticyl 20 mg. daily, in four equally divided oral doses—17 cases.

Group V—Ascorbic acid 300 mg. daily orally in divided dose and vitamin B-complex 1 c.c. daily by I.M. route—17 cases.

The cases in group V were taken as controls. All the cases in the first four groups received 300 mg. ascorbic acid daily orally and vitamin B-complex 1 c.c. daily by I.M. route.

The patients were asked to report at an interval of about 10 days when clinical assessment was made and biochemical investigations repeated until they returned to normal.

Results

All the 88 cases showed high serum bilirubin level and elevated thymol turbidity on the first day of observation. Cases in group II had on average a higher serum bilirubin (7·0 mg. per cent) than in other groups ; while thymol turbidity was more elevated in cases in group III (average being 11·2 units).

Out of 88 cases observed, 3 cases relapsed and 3 terminated fatally. Of the rest, 15 cases showed deterioration in the liver function tests on the 10th day of examination, followed by gradual improvement. Four of these cases belonged to Group I (treated with B_{12}), 3 to group II (treated with aureomycin and bidecorticyl), 3 to group III (treated with aureomycin) and 5 to group V (control group). No instance of deteriorating liver function test was noted in cases treated with bidecorticyl alone (i.e. group IV).

Table 1 indicates that the serum bilirubin fall was more dramatic in cases in which bidecorticyl was given alone or in combination with other drugs (group IV and II respectively). The fall in thymol turbidity was not striking with any type of therapy, though it showed gradual improvement in all the groups. The shortest period in which the jaundice cleared after the initiation of therapy was 29·4 days in group IV, while the longest period was 45·3 days in group I. The period was 48·7, 55 and 43·9 days in groups II, III, and V respectively.

Of the 3 cases which relapsed, one belonged to group II (Case No. 16), relapse occurring after 35th day, another to group III (Case No. 15), relapse occurring after 39 days of gradual improvement and the third one to group V (Case No. 15), relapse occurring after 30 days of improvement. In all the 3 cases however jaundice disappeared after a month to a month and a half, and the patients returned to normal.

Case number 1 of group II, 2 of group III and 8 of group V expired, the mortality rate being 3·3 per cent. Case No. 2 of group III showed progressive improvement of the liver function tests for 3 consecutive examinations, deterioration being noted on the 4th examination, i.e., on 46th day, when the patient passed into hepatic coma and died. The other two fatal cases never showed improvement in the liver function tests.

The number of days in which the liver function tests returned to normal after initiation of therapy did not vary significantly with any form of therapy—in four of the treatment groups the range being from 38·6 to 49·1 days, and only in group III was it a little delayed, being 55·1 days.

Discussion

Among all the therapeutic agents used in the present study, corticosteroids when given alone produced the most gratifying results. This conclusion is further borne out by the fact that jaundice disappeared in an average of 29·4 days of starting bidecorticyl therapy, which in the control group it took an average of 39·0 days. In the other treatment groups the value was 45·3, 35·7 and 33·2 days respectively for those treated with vitamin B_{12}, aureomycin, aureomycin and

Table 1—Showing Average Serum Bilirubin (in mg. per cent) and Thymol Turbidity (in Maclagan units) in Subsequent Examinations according to the Treatment Groups.

Group	1st. Exam. 1st. day		2nd. Exam. 10th. day		3rd. Exam. 22nd day		4th. Exam. 34th day		5th. Exam. 46th day		6th. Exam. 57th day		7th. Exam. 65th day		No. of days in which jaundice cleared after start of therapy	No. of days in which liver function tests returned to normal
	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity	Serum bilirubin	Thymol turbidity		
1	4·4	8·2	4·0	8·1	2·6	6·8	2·1	6·5	1·6	4·9	1·2	5·1	1·1	4·9	45·3	49·1
II	7·0	10·4	4·8	8·4	3·0	6·7	2·1	6·0	1·5	4·8	1·6	4·6	1·0	3·9	33·2	48·7
III	4·5	11·2	3·8	9·1	2·5	7·4	1·5	6·8	1·1	5·8	1·0	5·6	1·0	7·1	35·7	55·1
IV	4·9	9·7	2·8	6·9	1·5	6·1	0·9	4·6	0·9	4·8	0·7	3·3	...	...	29·4	38·6
V	5·1	7·6	3·9	6·9	2·4	5·5	1·7	4·3	1·3	3·8	1·0	3·6	...	...	39·0	43·9

bidecorticyl together. In addition, a feeling of well being and increase in appetite occurred within 48 to 72 hours in all the cases treated with bidecorticyl alone. Although this effect occurred in patients treated with aureomycin, and aureomycin and bidecorticyl together, it was not so striking, specially in the former.

The improvement in the general well being, appetite and rapid diminution of serum bilirubin with corticosteroids has also been noted by many workers (Colbert, 1951 ; Ducci and Katz, 1952 ; Huber, 1955, Havens, 1957) who advocated its use in infective hepatitis. Ducci and Katz (1952) noted that in patients treated with cortisone, the serum bilirubin came to normal level about 2 weeks earlier than in controls. Sherlock (1954), on the other hand, considers corticosteroid therapy as an "eye wash" which only serves to "mark time", so that the enormous regenerative power of the liver will be able to cope with necrosis.

In the group where corticosteroid was combined with aureomycin (group II), the less satisfactory result was probably due to the deterimental effect of aureomycin. This is further supported by the fact that when aureomycin was used alone (group III), jaundice disappeared considerably later than in case of the controls (group V), there being in addition one case of relapse and one of death. These facts, together with one fatal incidence in the cases treated with aureomycin and bidecorticyl together, i.e group II, (there being no fatal outcome when bidecorticyl was used alone), supports the contention that aureomycin is not only useless in infective hepatitis but rather harmful. Shorov and Sutherland (1951) observed an increase in liver fat in 7 out of 16 cases with chronic liver disease when treated with aureomycin. This was not observed in normal dogs and rats maintained on adequate fat diets with level of aureomycin approximating therapeutic one (Sutherland 1951). Rao and Balkrishnan (1957) concluded that oral chlortetracycline did not make substantial difference in the progress of an average case of infective hepatitis. The mechanism of rapid disappearance of jaundice by corticosteroid therapy has not been explained. A number of suggestions has been made including (a) inhibition of some hypothetic haemolytic action, (b) increased renal excretion of bilirubin, and (c) choleretic action of the steroids (Havens, 1957). None of these have been proved.

Results with B_{12} therapy in the present study was on the whole disappointing. The jaundice took an average of 45·3 days to disappear after initiation of therapy while it was 39·0 days in the control group. Campbell and Pruitt (1955) first noted the beneficial effects of B_{12} in infective hepatitis following the liver protecting action of the drug noted by Vorhaus and Vorhaus (1954). On the other hand, Rachmilewitz *et al* (1958) showed elevated serum B_{12} levels and serum B_{12} binding capacity in patients with acute and chronic parenchymatous liver disease. This was not seen in obstructive jaundice and may be related to the release of B_{12} from damaged liver cells. These findings have been confirmed. It is more difficult to understand why, in the presence of elevated serum levels of this vitamin, its administration should be even thought of for benefiting patients with liver disease.

The insignificant difference in number of days in which liver function tests returned to normal indicates that none of the drugs used, perhaps, had any effect on the course of the disease itself.

Summary

An attempt has been made in the present study to assay the role of various drugs in infective hepatitis on the basis of clinical features and biochemical investigations.

Most gratifying results were obtained when corticosteroids were used alone. The incidence of relapse with this drug was insignificant (2·8 per cent). Results with vitamin B_{12} and aureomycin were far from encouraging.

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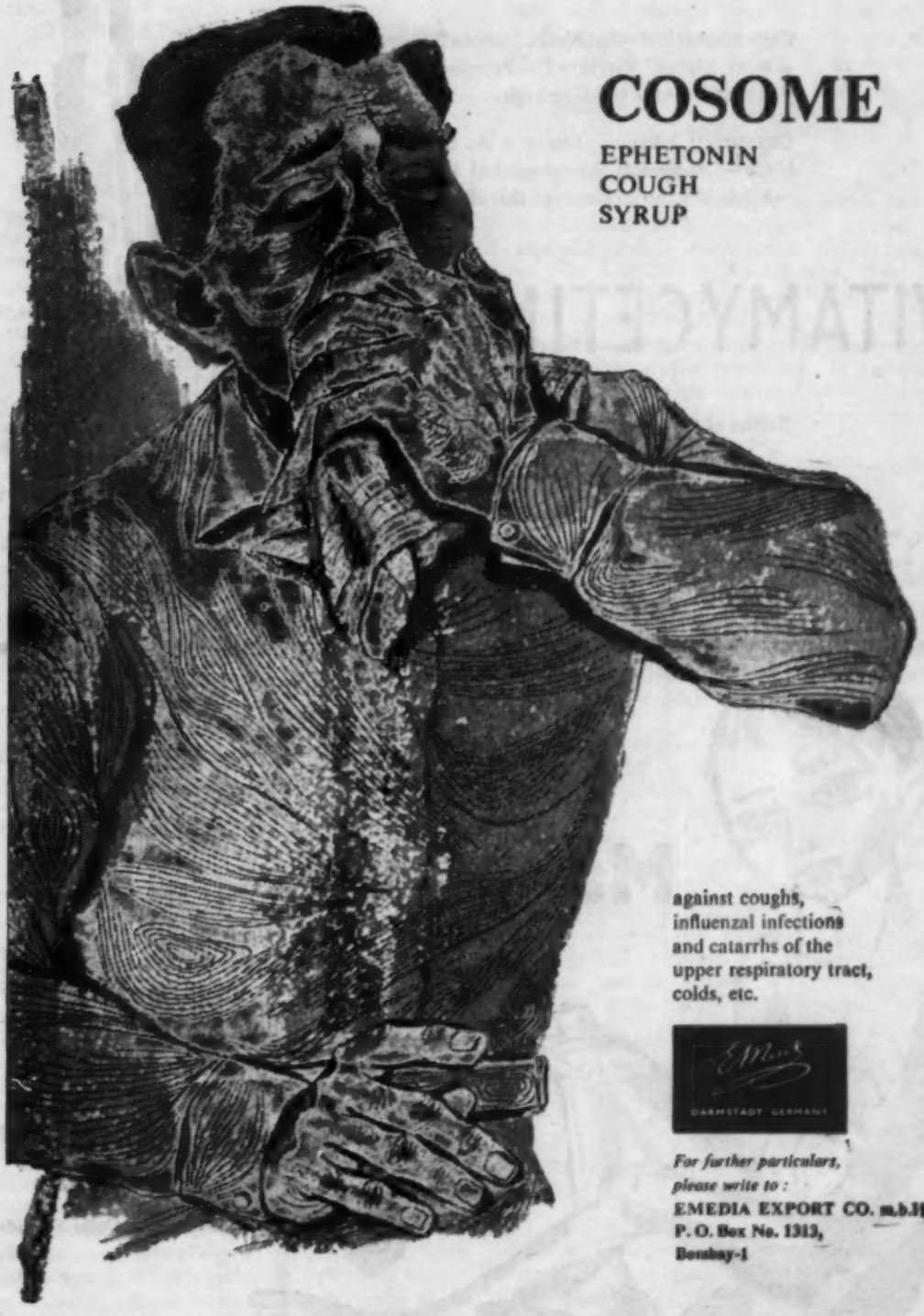

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STERILISATION IN THE MALE FOR SPACING OF CHILD BIRTH

P. S. JHAVER, M.S., F.I.C.S.

Indore

The subject of sterilisation for the control of overpopulation is receiving increasing attention from all quarters. A few years ago when the family planning programme was undertaken by the Government of India, sterilisation was not selected as a method for the family planning. It was thought that as sterilisation was a permanent measure for control of conception, it cannot be included in the family planning programme. The failure of the rhythm method of birth control and the insignificant success of the chemical and mechanical contraceptives, have now drawn our attention to sterilisation. The Governments of Madras and Kerala, in this country, and that of Japan have already undertaken a mass programme of voluntary sterilisation. It is a bold step in checking the rapidly growing population in this country. The 350 million population of India has increased by fifty million in the last ten years.

Sterilisation for the control of conception can be done for man or woman. The subject of vasectomy will be discussed in this paper. This operation is not a new subject to the medical profession. Enough experimental and clinical work has been done on the subject (Cooper, 1830). It was accidental vasectomy during a hernia operation in 1907, that made it necessary to make an attempt at repair of the cut vas (vasorraphy). Since 1907 many workers (Twyman and Nelson, 1941 ; Cameron, 1945 ; O'Connor, 1948 ; Handley, 1951 ; Phadke, 1953 ; Dorsey, 1957) have successfully carried out vasorraphy. Although the clinical data for vasorraphy was available from amongst the 'sterilised' persons, or when the vas was accidentally cut during surgical operation, not enough clinical material was available from any surgeon performing a long series of such operation. Yet the operation of vasorraphy is established.

Can sterilisation in men be used for spacing childbirth? This question occurred to the writer, while he was performing sterilisation operations during the last ten years. During vasectomy a short segment of the vas deferens is excised. It has been reported that mere division of the vas deferens was followed by a natural reunion with canalisation in human beings as well as in animal experiments. No mention has been made as to how long after the division of vas deferens the natural reunion took place, and whether the ends of the vas deferens were ligatured after division, and if so ligatured, with what material?

The author has been carrying on studies on sterilisation in men. His technique has been a single incision scrotal operation, excision of a short segment of the vas deferens, and ligature of the cut ends of the vas deferens with chromic catgut No. 1 (now changed to cotton thread). In July-October 1956, the chromic catgut was not available, and so plain catgut No. 0 was employed. In a follow-up study later, four operated persons reported conception in their wives after 8 to 16 months of the operation. The problem was discussed and a study made of conception taking place even after vasectomy. It was found that all these cases were operated during July-October 1956 when plain catgut ligature was used. Examination of the semen of these persons showed presence of motile spermatozoa. At the second operation it was found that the site of the breach in vas deferens was now occupied by a fusiform swelling, which was continuous on either side with the vas deferens. The vas deferens with this fusiform swelling was then excised. Fluid injected through one end of the vas deferens was seen first filling this fusiform swelling and then coming out at the other end. Further, pathological sections were made which also suggested that natural reunion and canalisation had followed the operation.

Natural reunion and canalisation follows mere division of the vas deferens. Recanalisation occurred after vasectomy in our cases (Ohri and Jhaver, 1958, Jhaver and Ohri, 1959). "If the vas deferens is only tied with absorbable ligature, it is quite likely that in course of time it will recanalise. The time at which recanalisation will take place, will depend upon the ligature material used. If natural reunion and canalisation of the cut vas deferens and canalisation after ligature of the vas deferens can be planned and timed, sterilisation for spacing childbirth can be achieved."

The subject is being studied for the last few years, and it is hoped that vasoligation with different materials, will follow recanalisation after specific periods of time. Vasectomy, vasorrhaphy and vasoligation for spacing childbirth are subjects which will play a big role in the solution of the population problem.

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SURGICAL STERILISATION IN THE FEMALE

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The rapid rate of increase in the population of India and other eastern countries has posed a problem, both social and economic, at a national and international level, and different methods for the control of conception have been advocated. With proper indications, general surgeons and gynaecologists are now performing these operations for surgical sterilisation in the female.

Of the operations on the fallopian tubes, carried out through a laparotomy incision, the following methods (Baird, 1957 ; Bourne, 1955 ; Vaish, 1959) are generally advised :

1. *Madlener's* operation, in which the middle third of each tube is crushed and the loop tied with a non-absorbable ligature.

2. *Pomeroy's* operation, in which each tube in turn is pulled in its middle third, and the loop so formed is tied with fine catgut. The tube is not crushed first.

3. *Irving's* operation, in which about an inch of each tube and part of the adjoining mesosalpinx, held between clamps, are excised, and the intervening tissues are ligated. The lateral cut ends are buried between the two peritoneal layers of the broad ligament, and the inner cut ends are buried below the peritonium on the posterolateral surface of the uterus.

4. Cornual resection of proximal ends and ligation of the distal ones. This method is not generally recommended.

5. Bilateral total salpingectomy. This method is seldom used.

6. Aldridge's method, in which a temporary tubal interception is effected.

The author presents a modification of Irving's method, by introducing 'purse-string' burying of the cornual stump, which he has practised successfully in his last 150 cases.

TECHNIQUE (Fig. 1)

1. Ligature A is tied round the tube about 1½ to 2 inches from the cornual end.

2. Ligature B is tied round the cornual end.

3. A haemostatic transfixing ligature C is tied on the mesosalpinx about ½ inch below the fallopian tube, and between the points A and B.

FIG. 1.

4. The tube is now picked up and excised between A and B.

5. A purse-string suture D is placed round the stump B. This is tightened, burying the stump, as done in an operation for appendectomy. Ligature A is buried between the peritoneal layers of the broad ligament.

6. No. 10 cotton thread is used throughout.

The above steps are repeated for the opposite side.

DISCUSSION

In some post-partum cases a fairly large blood vessel courses along the under surface of the cornual end of the tube. This vessel is easily seen and safely anchored in ligature B. The oozing of blood on the surface of the uterus automatically ceases as the purse-string suture is tightened.

The advantages of this modification are :

1. It is easy to perform and comparatively fool-proof.

2. Perfect haemostasis is ensured by ligature C.

3. The stumps are completely peritonised.

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GENERAL PRACTICE IN BOMBAY

A Review of Patients Seen in One Year's Practice

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Bombay

General practice has been considered the backbone of the medical profession in all parts of the world, and with the formation of Colleges of General Practitioners in several countries it has become the heart and soul of the profession. This communication is a short account of the state of general practice in the city of Bombay, with particular reference to an analysis of cases handled during the course of a year in a single unit practice. This practice is situated in a middle-class residential area and is drawn from patients mostly of a similar social stratum with a leavening of the upper and lower ends. The cases discussed are those seen for the first time between March 1, 1958 and February 28, 1959.

METHODS

All patients seen for the first time, either at the surgery or at the patient's home, were entered in a register giving their sex, age, disease group and whether any pathological investigations, x-ray or reference to a hospital or specialist were carried out. The inclusion of the social group of the patient was not found feasible in many cases. Twenty disease groups were adopted (Table 4). In addition one group for miscellaneous and one for obscure cases were maintained. The miscellaneous group comprised those not coming under the 20 disease groups and the obscure group consisted of the inevitable undiagnosed ones. Cough/cold and flu have deliberately been kept separate from the respiratory group, as they comprised a large bulk of the practice and were worth separating.

Only first consultations were entered, the diagnosis having been made on the spot or in retrospect. In most cases the diagnosis was entirely clinical, as it usually is in general practice. However, an attempt was made to reach a confirmatory diagnosis as often as possible. Hence this work gives an idea of the sex, age distribution and the nature of illness encountered in an average middle-class area in a big tropical city.

RESULTS

The total number of new patients seen in their homes or in the surgery was 3,201 with a monthly incidence as follows (Table 1):

TABLE 1—SHOWING MONTHLY INCIDENCE

Month	No. of new patients	Month	No. of new patients
March '58 ...	314	Sept. '58 ...	261
April '58 ...	274	Oct. '58 ...	271
May '58 ...	300	Nov. '58 ...	256
June '58 ...	236	Dec. '58 ...	260
July '58 ...	253	Jan. '59 ...	293
Aug. '58 ...	235	Feb. '59 ...	248

The month of March 1958 showed the highest incidence of patients followed by May and January. The months of March, April and May corresponded with the hot season before the monsoon when the atmosphere is very hot and humid, and January responded the "cold"' season. Otherwise the incidence of illness revealed no particular monthly variation.

The sex incidence is set out in Table 2. Female patients were 1,475 (46 per cent) out of a total of 3,201, and males were 1,726 (54 per cent).

TABLE 2—SHOWING SEX INCIDENCE

Female		Male
164	March '58	150
151	April '58	123
140	May '58	160
93	June '58	143
130	July '58	123
116	Aug. '58	119
117	Sept. '58	144
113	Oct. '58	158
90	Nov. '58	166
98	Dec. '58	162
143	Jan. '59	150
114	Feb. '59	134

From these figures it is apparent that men constituted the greater percentage of patients in this practice. This is contrary to the generally accepted view that women are more frequent attenders at doctors' surgeries (Fry, 1957).

The age distribution is seen in Table 3. Young adults in the 20 to 30 age group constitute the largest percentage of patients attending for the first time, followed closely by the 30 to 40 age group. From these statistics there does not appear to be so far any geriatric problem, which is the generally accepted opinion in these parts.

The number of patients in each disease group and their percentage is set out in Table 4.

The upper respiratory infections form a large majority, coughs and colds being the most common complaint. In this connection there is naturally a certain degree of personal error in separating out the cough/cold group from the E/N/T/ sinuses and the flu group, as it is often impos-

TABLE 3—SHOWING AGE DISTRIBUTION

Age group	Patients	
	No.	Per cent
0—6 mo.	52	1·6
7 mo.—1 yr.	90	2·8
13 mo.—2 yrs.	90	2·8
3 yrs.—5 yrs.	256	8·3
6 yrs.—10 yrs.	344	10·7
11 yrs.—20 yrs.	307	9·6
21 yrs.—30 yrs.	633	19·9
31 yrs.—40 yrs.	596	18·6
41 yrs.—50 yrs.	343	10·7
51 yrs.—60 yrs.	248	7·7
61 yrs.—70 yrs.	130	4·1
71 yrs. and above	103	3·2

sible to say when a patient is a case of 'sore throat' or tonsillitis or merely a cold with a sore throat. If both these are combined under one big bracket they would form an overwhelming majority of patients who attend a doctor's surgery. Likewise, in defining 'flu', this entity has been restricted to the syndrome of fever, body pains, and malaise, with or without a cold. With the memory of the recent flu pandemic still fresh in one's mind, a doctor is inclined to define these cases as similar to those seen during that epidemic.

In the E/N/T/sinuses group, the majority were those suffering from tonsillitis or sore throat, the ears next and the nose and sinuses last.

The lower respiratory group contains 31 cases of pulmonary tuberculosis which represents 15·1 per cent of the lower respiratory infections and 0·97 per cent of all cases seen in this practice. This probably reflects the high incidence of this disease in the country in general.

The alimentary group is as large as the cough/cold group and consists of upper and lower alimentary tract illnesses as well as diseases of the liver and gall bladder. No attempt has been made to differentiate between upper and lower alimentary tract disease.

In the tropics a large percentage of alimentary tract infections are due to amoebic and bacillary dysenteries and intestinal parasites. As amoebic infection is of great importance a particular note was kept of these. There were 35 cases of intestinal amoebiasis treated on clinical grounds or after stool examination, and 5 cases of amoebic hepatitis. This indicates that amoebic infection comprises 9·4 per cent of alimentary tract infections here dealt with. However, the true incidence of amoebic infection cannot be estimated, as the condition may virtually be symptomless and often evades diagnosis, as is well known.

TABLE 4—SHOWING NUMBER AND PERCENTAGE OF PATIENTS IN EACH DISEASE GROUP

Disease group	1958										1959		Total	%
	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.		
Cough/Cold	25	32	27	17	40	32	54	33	46	41	38	34	419	13·1
Flu	15	15	22	24	27	21	26	11	11	13	13	11	209	6·5
E/N/T/Sinuses	21	27	40	23	25	23	20	31	29	27	38	27	331	10·3
Lower respiratory ...	15	19	21	16	14	22	15	26	17	18	14	8	205	6·4
Alimentary	34	37	39	39	34	36	28	27	30	43	49	29	425	13·3
C.V.S.	8	6	5	3	2	5	4	6	9	7	5	5	65	2·0
C.N.S.	5	1	—	1	2	3	—	2	—	3	3	4	24	0·7
Urinary	6	1	6	6	2	1	4	4	2	4	4	1	41	1·3
Genital	—	1	1	3	2	—	3	2	3	2	5	5	27	0·8
Gynaec./obstetrical ...	4	5	9	8	6	7	6	7	4	4	7	6	73	2·3
Bones/joints/muscles ...	6	11	9	4	11	6	7	9	7	7	9	4	90	2·8
Infectious diseases ...	27	10	12	6	3	2	6	15	6	11	17	21	136	4·2
V.D.	9	5	10	6	4	3	3	3	5	6	3	60	1·9
Eye	4	1	1	2	2	2	1	3	6	—	4	4	30	0·9
Skin	19	18	36	23	18	12	19	14	7	12	8	12	198	6·3
Vaccination/inoculation ...	55	35	16	5	15	9	10	12	8	8	23	14	210	6·6
Neurosis	3	—	3	3	1	3	3	5	2	1	4	4	32	1·0
Accidents/surgical ...	12	9	8	12	9	8	15	19	17	14	14	14	151	4·7
Dental	5	4	2	2	5	3	1	3	2	1	3	5	36	1·1
Metabolic	6	3	2	1	2	3	8	6	2	3	3	4	43	1·3
Miscellaneous	24	22	14	19	16	20	15	23	18	20	18	27	236	7·4
Obscure	11	12	17	13	13	14	13	10	27	16	8	6	160	5·0
Total ...	314	274	300	236	253	235	261	271	256	260	293	248	3,201	99·9

There were 136 cases of infectious diseases made up by measles, German measles, chickenpox, smallpox, whooping cough, diphtheria, glandular fever, mumps, typhoid, fever, tetanus and leprosy. Mumps was in the majority with 27 cases, followed by chickenpox (22) and measles (20). A single case of smallpox was encountered. The majority of the chickenpox cases and the single case of smallpox were seen in the hot season (March to April) before the monsoon. There were 5 cases of diphtheria scattered over the 12 months, a single case of glandular fever which is not common in this country, 3 of leprosy, 1 tetanus and 19 of typhoid fever. The majority of these typhoid fever cases occurred between the months of October and February.

Venereal disease has always been an interesting study. 60 cases of V.D. consisted of 15 cases of syphilis, all primary, 33 cases of gonorrhoea, 6 with combined syphilis and gonorrhoea, 4 with lymphogranuloma venereum, 1 with non-specific urethritis and 1 Reiter's syndrome associated with gonorrhoea.

Vaccinations and inoculations form a relatively large percentage (6·6 per cent), due to the fact that in the tropics there is always a large demand for prophylaxis against smallpox, typhoid fever and cholera. The majority of the vaccinations were in the month of March corresponding to the smallpox 'season'.

The miscellaneous group consists of a wide variety of ailments which do not fit in any of the 20 disease groups, such as anaemia, allergies, lymphadenitis, teething, alcoholism, dog bite, snake bite (1), tubercular glands, opium addiction, impotency, tropical eosinophilia (4), umbilical fistula in a newborn, clubbing of the fingers (idiopathic), barbiturate poisoning (1), scleroderma (1) and several others.

The obscure group of undiagnosed cases was surprisingly large and though it indicates that 5 per cent of the patients in this practice went undiagnosed they were not necessarily uncured and certainly were benefited by treatment.

Carcinoma was seen in 8 patients and was situated in the following organs: liver, tongue, lung, colon, stomach (2), thyroid and mediastinum (malignant teratoma). All patients have expired at the time of writing.

There were 12 deaths in this period, the various causes being: fracture of the neck of the femur, old age, pulmonary tuberculosis, general debility (2), carcinoma stomach, malignant teratoma, carcinoma of the lung, cirrhosis of the liver, cerebral thrombosis, ruptured aneurism of the aorta and pulmonary oedema.

One or more pathological or radiological investigations were carried out in 255 patients (8 per cent) and 157 (4·9 per cent) were referred to either hospital or specialist for further investigation or treatment.

Discussion

Only in the last decade has general practice been investigated as a lucrative field of medical research. The deeper one delves into it the more interesting does it become and surprising conclusions come to light. Indeed, a significant feature is the large amount of patient work that a busy practitioner can go through during his limited surgery hours. The keeping of records brings these facts to light in an interesting manner.

The main stimulus for keeping these records from which the article is compiled was an attempt to sort out the patients and their illnesses in a scientific manner. This work was undertaken without secretarial assistance and single handed, and the cost of material amounted to a few large sized exercise books.

A large amount of the material seen is 'trivial', but nevertheless of sufficient importance to send the patient to his doctor. At the same time many 'rare' and 'interesting' cases were encountered or came to light when one considered all cases, trivial or otherwise as equally interesting and a source of information.

Continued work over several years will bring out even more interesting material and information, particularly with regard to epidemiology and statistical data. This will also place one in a better position to judge the incidence of disease with regard to age, sex, climate occupation, etc.

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CASE NOTE

INTESTINAL HAEMORRHAGE IN TYPHOID FEVER

PITAMBAR DAYAL, M.B.B.S., M.R.C.P.

AND

M. M. MISHRA, M.B.B.S.

Alexandra Hospital, Alwar

A male, aged 20, was admitted on 29-9-58 with history of continued fever for the last 20 days. The fever was mild for the first 10 days, the temperature rose gradually, in a 'step-ladder' pattern. The patient received no treatment for the first 10 days but later had Ayurvedic treatment

which failed to control the rising temperature. On the 14th day he passed a large quantity of frank blood per rectum and this bleeding continued for 2-3 days. Later he started passing black-coloured stools—the quantity went on increasing gradually. On the day of admission he was said to have passed about 2 lb. of black coloured stool, and became cold, clammy and unconscious when he was admitted into the hospital.

On examination the patient was found unconscious, toxic, cold and clammy, dehydrated and pale and had a pinched facies with sunken eyes. The pulse was 132 per minute, of very low volume and tension. The temperature was 97°F, respiration 24 per minute and B.P. 80/40 mm. Hg. The tongue was dry and coated, with the tip and margins clean. The pupils were dilated and reacting sluggishly to light. The abdomen was markedly distended and tense. Abdominal respiratory movements were present with the percussion note tympanitic all over the abdomen. The liver and spleen were not palpable, the ascending and descending colons were distended ; the lungs were full of crepitations on both sides. The heart sounds were feeble. Typhoid eruptions were seen on the chest and abdomen.

The stool passed just after admission was about 1 lb., black in colour with a few blood clots, and foul smelling.

Investigations—Blood picture : R.B.C.—1·2 million/c.mm. Blood group conformed to III (B). W.B.C.—5800/c.mm. with neutrophils 60 per cent, lymphocytes 32 per cent, monocytes 6 per cent, and eosinophils 2 per cent.

Widal test was positive with T_H positive in 1 : 125 and T positive in 1 : 200.

Stools—Occult blood present (+ + +) and culture showed *S. typhi* (+ +).

Treatment—1. Blood transfusion—2 units of blood (group III) was given stat and the second transfusion of 2 units was given on the 5th day of admission.

2. During the unconscious state chloramphenicol 500 mg. was given I.M., 8-hourly for 48 hours, and then 12-hourly for next 24 hours. After 3 days the temperature came down by crisis and the patient regained consciousness. Henceforth chloramphenicol capsules were given in gradually reducing dosage of 1 capsule 6-hourly, alternating with aureomycin capsules.

3. Plasmex injection was alternated with injection of glucose in normal saline. Peristan—'N' was given by I.V. drip.

4. Injection morphine gr. ¼ with atropine sulphate gr. 1/100 was given stat, and repeated s.o.s.

5. Injection of Coagulen (Ciba), 5 c.c., I.M., twice daily.

6. Prednisone (5 mg. tablet)—1 tablet 4-hourly, then 6-hourly to 8-hourly and finally 12-hourly was given upto 10-10-58. (During the unconscious state, cortisone injections were given in doses of 100 mg. 12-hourly).

7. Dovers' powder gr. 5, twice daily for 2 days, and then s.o.s.

8. Other symptomatic and building-up treatments were given.

Short progress report—On the day after admission the temperature shot up and remained high ranging between 102° to104° for 3 days and then came down by crisis.

On 3-10-58 the patient regained consciousness and was comfortable. He did not pass any stool for the last two days. Pulse was 108 per minute, of feeble volume and low tension ; respiration 18 per minute, temperature 98°F and B.P. 86/40 mm. Hg. Tenderness in both iliac fossae and hypogastric region. Both lung bases were congested. General condition was fair.

On 4-10-58 at 12-15 A.M., the patient passed about 4 to 6 ounces of dark-coloured blood in the stool. Pulse rate was 104 per minute, of fair volume and tension, respiration 20 per minute, temperature 97·6°F and B.P. 92/50 mm. Hg. There was generalised tenderness all over the abdomen. The general condition of the patient was low.

On 6-10-58 the patient felt comfortable. Pulse rate was 112 per minute, of fair volume and tension ; respiration 20 per minute, temperature 98·6°F, and B.P. 100/50 mm. Hg. There was less congestion in the lungs, and the general condition was fair.

After this the patient did not have any melaena and his general condition improved gradually. Recovery was complete.

Discussion

In typhoid fever the characteristic lesions are in the small intestine. The Peyer's patches and solitary follicles become swollen. Necrosis ensues in these lymphoid masses and sloughs are formed. The ulcers are ovoid and lie along the long axis of the bowels.

In this case the Ayurvedic physician might have used some irritant medicines which led to early separation of these sloughs, causing damage to the intestinal blood vessels leading to severe haemorrhage. Repeated blood transfusion, administration of antibiotics and prednisone saved the patient.

Acknowledgment

We wish to thank Dr. C. M. Sharma, P.M. & H.O., Alexandra Hospital, Alwar, for permission to report this case.

JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, JUNE 16, 1960

INFECTIVE HEPATITIS

The clinical entity of infective hepatitis has been a subject of controversy for more than a decade. Even now no specific treatment for the causative viral agent of infective hepatitis is known. Indeed even if it were known, it would be of little use, for in infective hepatitis the invasion of the liver parenchyma precedes the onset of jaundice. Generally when the disease has progressed to the point where a diagnosis can be made, the major damage has already been inflicted, in much the same fashion as in poliomyelitis.

Vitamin B-complex and ascorbic acid have been observed to produce beneficial effect in patients with alcoholic cirrhosis[1]. It is difficult to study with adequate control, the influence of each of the many factors in the B-complex group as well as of vitamin C in a disease as clinically variable as acute hepatitis. For the most part vitamins have been given to these patients empirically.

Vitamin B_{12} in dosage of 30 μg. intramuscularly daily has been found to shorten the course of acute hepatitis[2]. Results both in favour of and against this observation were noted in experimental animals by several workers[3, 4, 5] who demonstrated elevated serum vitamin B_{12} levels in patients with parenchymatous liver disease due to release of the vitamin from damaged liver cells. It is thus difficult to understand why vitamin B_{12} should be administered to patients with infective hepatitis.

With the advent of chemotherapeutic agents and antibiotics it was but natural to try them on patients with infective hepatitis. In view of certain antiviral properties of the broad-spectrum antibiotics, it was hoped that they might provide a specific remedy for the disease. While a few workers have suggested that the course of the disease was shortened by their administration, most investigators have felt that they did not influence the disease at all. Some workers[6, 7] believe that there are enough evidence to suggest the beneficial role of broad spectrum antibiotics in fulminant types of hepatitis, particularly those in coma[8, 9].

In the beginning results of corticoid therapy were somewhat conflicting but on the whole, definite beneficial effects[10] were observed, viz., fever subsided, appetite improved, jaundice appeared to clear more quickly, and there was a subjective feeling of well-being. This early enthusiasm[11, 12] was however damped by long range studies which suggested an increase in relapse rate in patients treated with corticoids[13]. With the introduction of the newer corticoids, the untoward side effects which limited their use have been minimised. There is general agreement that corticoids should not be used in the ordinary cases of infective hepatitis but should be used only in those cases which were not responding to conventional therapy, or in cases with a prolonged or fulminant course, where their administration may be lifesaving.

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CURRENT MEDICAL LITERATURE

Enzyme Studies in Myocardial Infarction

HOWELL, N. R. AND SMITH, A. J. (*Brit. M. J.*, **2**: 459, 1959) from the University of Durham and Royal Victoria Infirmary, Newcastle-upon-Tyne write:

Serial daily estimations of serum glutamic pyruvic transaminase (S.G.P.T.), serum aldolase, and serum oxidase for at least 10 days have been made in a series of cases of acute myocardial infarction. The results have been compared with similar estimations of serum glutamic oxalacetic transaminase (S.G.O.T.) and with the erythrocyte sedimentation rate (E.S.R.), temperature, and electrocardiogram.

Estimations of these enzymes have been made in 50 healthy adults. The upper limit of normal (mean plus twice the standard deviation) in the present series is S.G.O.T. 28 units, S.G.P.T. 21 units, serum adolase 9·2 units, and serum oxidase 372 units.

Elevation of S.G.P.T. occurs in 82 per cent of cases of myocardial infarction with a raised S.G.O.T. The rise occurs a day later, lasts a day longer, and is of much smaller degree than the rise in S.G.O.T.

Serum adolase rises rapidly in almost all cases of acute myocardial infarction. It reaches a peak in two to three days and falls rapidly. A secondary rise occurs about five days after the initial peak.

Serum oxidase rises gradually over the first nine days, may remain steady for a few days, and then falls to normal in most cases by the end of three weeks. There is no direct correlation with S.G.O.T. levels, and serum oxidase may remain normal with markedly elevated S.G.O.T. levels.

There is no consistent correlation between the E.S.R., temperature, or electrocardiogram and the secondary rise in serum adolase or the rise in serum oxidase.

Coronary insufficiency without infarction does not alter the level of S.G.O.T. or S.G.P.T.

Elevations of S.G.O.T., S.G.P.T., serum adolase, and serum oxidase may occur in cardiac failure with centrilobular necrosis of the liver.

Susceptibility of Haemophilus Influenzae to Antibiotics

HIRSCH, H. A. AND FINLAND, M. (*Am. J. M. Sc.*, **239**: 32, 1960) from the Thorndike Memorial Laboratory, Second and Fourth (Harvard) Medical Services, Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston, Massachusetts, give in the following lines the summary of their observations:

Strains of *Haemophilus influenzae* isolated early in 1959, mostly from the respiratory tract of hospitalised patients were tested for *in vitro* susceptibility to 21 antibiotics, including several that had been used previously for similar tests on strains isolated in 1954 and 1949 and also several groups of related antibiotics.

All of the antibiotics were roughly similar in their activity against these organisms except bryamycin and some of the erythromycin-like antibiotics (carbomycin, oleandomycin, spiramycin and leukomycin) which were much less active, and penicillin which was more active than all the others against more than one-half of the strains.

The results obtained with the strains isolated in 1959 were similar to those obtained with some of the same antibiotics in the 2 earlier studies. In both of those studies all of the strains tested were found to be resistant to bacitracin, which was not included in the present tests.

It may be concluded that there has been no significant change in the antibiotic susceptibility of strains of *H. influenzae* isolated in this hospital during the past 10 years. Most of the newly introduced antibiotics are about as active against *H. influenzae* as those that were previously available, but some of the erythromycin-like antibiotics, namely carbomycin, oleandomycin, spiramycin and leukomycin are much less active. Colimycin appears to be slightly less active than polymyxin B; the 4 tetracycline analogues all have very similar activity and there are only sight, and probably not significant differences in the activity of streptomycin, neomycin, kanamycin and paromomycin against strains of *H. influenzae*.

Susceptibility of Gonococcus to Antibiotics

HIRSCH, H. A. AND FINLAND, M. (*Am. J. M. Sc.*, **239**: 41, 1960) from the Thorndike Memorial Laboratory, Second and Fourth (Harvard) Medical Services, Boston City Hospital and the Department of Medicine, Harvard Medical School, Boston, Massachusetts write:

Strains of gonococci isolated in August, 1958 to February 1959 were tested for sensitivity to 20 antibiotics and sulphadiazine. With the exception of penicillin and sulphadiazine, each of the agents inhibited all of the strains tested within a fairly narrow range of concentrations. Different antibiotics varied quantitatively in their activity, but there were only minor differences in the susceptibility of the strains to chemically related antibiotics except in the case of those related to erythromycin which varied quite widely in their activity.

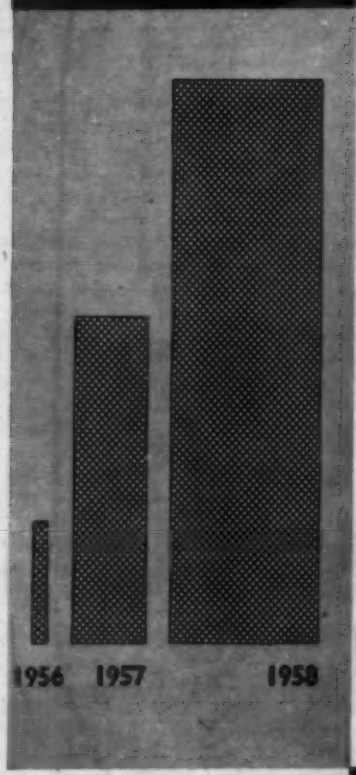
Strains isolated from patients soon after treatment with penicillin were among the least susceptible to that antibiotic. The recent strains were nearly all highly or moderately susceptible to sulphadiazine.

Comparisons of these results with the findings reported in previous years from this laboratory show no evidence of any large decrease in susceptibility of gonococci to any of the antibiotics that have been in use during the past few years.

Transfusion Reactions

Despite reasonable care, unpleasant reactions still occur after blood transfusion. Some, such as pyrogen and allergic reactions, are not serious, but others, such as citrate and potassium intoxication, transmission of disease such as viral hepatitis, development of a generalised bleeding state or of acute renal failure may be so severe as to lead to death. Transfusion of incompatible blood is the main cause of trouble, and it is difficult to assess the incidence of this mishap. A recognised haemolytic reaction occurs on the average once in about 3,000 transfusions, and an estimate of one death per 13,000 bottles of transfused blood has been reported.

Facts and Figures



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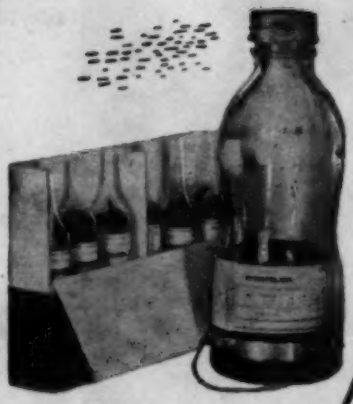

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CALCUTTA-13

If the numbers of the reported cases of acute renal failure after transfusion are taken as an index, the hazards of transfusion would seem to be unusually high in some countries. But this index is misleading, because the condition for which the transfusion is given—for example, post-partum haemorrhage—may alone be responsible for the development of acute tubular necrosis. Indeed, it is doubtful whether the excretion of haemoglobin by a normal kidney causes renal damage, though intravascular haemolysis may cause renal vasoconstriction and oliguria.

Writing on transfusion reactions and their treatment, especially with the artificial kidney, Barlas and Kolff (*J.A.M.A.*, **169**: 1969, 1959) report 16 patients admitted to the Department of Artificial Organs in Cleveland, Ohio, between 1954 and 1958 for treatment of renal failure. They imply that transfusion of incompatible blood caused the development of the renal failure in all cases, but the critical reader might welcome more detailed case histories before feeling certain of this. The authors consider three phases in such cases—the acute phase, the oliguric phase, and diuretic phase—and draw attention to the masking effect of general anaesthesia on the clinical features of the acute phase. If shivering, fever, pains in the loins, headache, nausea, vomiting, collapse, hypotension, or undue bleeding occur during a transfusion, they recommend immediate cessation of the transfusion, withdrawal of a blood sample from the patient for evidence of haemolysis and for direct crossmatching with blood from the suspected bottle, administration of 2 l. of 5 per cent dextrose with 300 mEq of sodium bicarbonate, and, when indicated, blood proved to be compatible or dextran. This treatment is similar to that recommended in Great Britain. With development of the oliguric phase—and this is unlikely to occur in more than 10 per cent of cases—treatment closely follows the principles evolved by Bull and his colleagues (*Lancet*, **2**: 220, 1949). This consists nowadays chiefly of fluid restrictions, administration of carbohydrate, and, on occasion, the use of ion-exchange resins. The place of prophylactic antibiotics is doubtful. In any case, erythromycin alone is better avoided and a combination of chloramphenicol and tetracycline is to be preferred.

Barlas and Kolff used the twin-coil disposable artificial kidney when their conservative methods seemed inadequate to control the clinical and biochemical deterioration which precedes spontaneous and adequate diuresis. Twelve patients were treated by dialysis while the remaining four recovered after conservative management alone. Three of the dialysed patients died. Barlas and Kolff conclude that the treatment of a patient who has received an incompatible transfusion is best given at a centre where facilities exist for dialysis. This may be so, but if an artificial kidney is not readily available no time should be lost before starting treatment on the usual lines. (Annotation, *Brit. M. J.*, **2**: 749, 1959).

Chemotherapeutic Pitfalls in the Treatment of Tuberculosis

POOLE, G. AND STRADLING, P. (*Brit. M. J.*, **1**: 161, 1960) from the Hammersmith Chest Clinic and the Postgraduate Medical School, Hammersmith Hospital, London, from an analysis of 32 fully documented case histories observe that there were 39 examples of drug resistance in *Mycobacterium tuberculosis*.

In 33 (70 per cent) of 47 initially resistant examples the prescription of PAS failed to prevent resistance to the other drug given. By far the most likely explanation of this is that PAS was not consumed in adequate and regular amounts. Evidence is also presented that PAS plus isoniazid given together in single cachet form may also not be effective, perhaps for the same reason.

No evidence was found that isoniazid is similarly rejected by patients.

In 14 examples (30 per cent) faulty prescription of drugs was responsible for the resistance. This included the use of one drug alone, prescribing one daily and the other intermittently, the use of such unproved substances as B.P.A.S., dipasic, or a thiosemicarbazone, and also oxytetracycline given with streptomycin.

The importance is stressed (a) of using sensitive drug-resistance tests and accepting a low threshold of resistance, (b) of scrutinizing a patient's previous therapeutic history and obtaining sensitivities where possible before prescribing further anti-tuberculosis drugs in an effort to avoid resistances, (c) of avoiding the prescription of PAS when its administration cannot be fully supervised, (d) of never using drugs that have not shown themselves satisfactory in rigidly controlled clinical and bacteriological field trials (B.P.A.S.; dipasic; thiosemicarbazones and their combinations such as "tebafan" and hinconstarch).

It is concluded that, until a more satisfactory oral agent can be found to accompany isoniazid, long-term daily streptomycin given with daily isoniazid is not only the most effective combination therapeutically but the only way of ensuring adequate treatment in spite of the patient's shortcomings.

The ease with which major therapeutic errors can be made with tragic consequences is fully stressed. This point is illustrated by the fact that 15 of the 32 patients in whom drug resistance occurred have since died of their disease; this is in stark contrast to the now usual results of correct long-term chemotherapy.

Recent Developments in Antibiotic Therapy

RANTZ, L. A. (*Ann. Int. Med.*, **52**: 362, 1960) from the Department of Medicine, Stanford University School of Medicine, San Francisco, California writes:

Two sulphonamides, a tetracycline, a member of the erythromycin group and an agent related to neomycin have recently been introduced. None has presented a significant advance over previously available related drugs, although each may establish itself in therapy of infectious disease.

Three antibiotics—vancomycin and restocetin, which have many features in common, and novobiocin—are distinctly different from all the agents previously available, and are of potential value in the management of antibiotic-resistant staphylococcal infection. Each has limitations, so it is apparent that the ideal chemotherapeutic agent for infection caused by these organisms is not yet at hand.

CURRENT TOPICS

MALARIA ERADICATION—A WORLD CHALLENGE*

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Malaria has been man's worst enemy for centuries, the worst sufferers being those living in the tropical and subtropical countries. Malaria still remains in 1960 a constant threat to 1,200 million human beings in the world out of a total population of 2,800 million. In India, it was estimated that nearly 100 million people fell prey to malaria every year before 1947, out of which over a million died annually. It was estimated that the loss on various scores such as loss of agricultural and industrial output, loss of wages, etc., in 1947 was Rs. 1,100 crores (11,000 million) annually in India in 1952, malaria claimed 75 million cases and a million deaths. It still affects 50 million Indians every year. In Uttar Pradesh, over 10 million people used to suffer from malaria about two decades ago, out of which a little less than a million succumbed to this disease every year.

Malaria is not a spectacular disease. Its victims show no wounds or mutilations to excite our pity; it comes upon them as they sleep, in the stillness of the night, carried by a stealthy attacker, *the mosquito*. But the truth is that malaria is a disaster. Its terrible consequences cannot be visualised in countries that are free from it. It strikes first at a country's most precious resources, its young children. The disease is held responsible for 10-15 per cent of infant mortality. Other diseases may decimate a population; malaria can depopulate a whole region. Throughout history, it has driven men off vast tracts of fertile land. And those who stay on, lead a miserable existence. The man who carries the malaria parasite in his blood is a man of blunted initiative, he is physically and mentally deteriorated under the repeated attacks of the shivering fever, he is apathetic and listless. Physical deterioration undermines his spirit and he becomes a fatalist. He also falls an easy prey to other killing diseases.

Besides infantile mortality and the physical incapacitation that it causes to mankind, malaria is also responsible for a very great economic loss to the country. Dr. D. K. Vishwanathan, Malaria Adviser at the W.H.O. Regional Office in New Delhi has recently estimated that the annual economic losses caused by malaria in India are in the neighbourhood of Rs. 250 crores (2,500 million), corresponding to loss of wages, loss of output etc., affecting the fifty million of our countrymen who fall victims to the disease every year.

Call of the Nations

Malaria, it will therefore appear, is the most important Public Health problem in India and several other countries. This malady is one of the greatest impediments in the way of increased agricultural output because it prevails mostly during the sowing and harvesting seasons. It is therefore imperative to eradicate malaria for the complete and unconditional liberation of twelve hundred million human beings in 148 countries or territories throughout the world, so that the vast multitude of people can enjoy an optimum level of health and are fit to contribute towards the development of agriculture and industry, especially in the underdeveloped countries of the world. Rightly, therefore, the World Health Organisation have initiated antimalaria operations in 92 countries of the world, which constitutes the greatest coordinated public health programme ever undertaken in the world history. Never before have concerted International forces on such a scale been deployed against a single disease.

National Malaria Control Programme

Government of India launched the National Malaria Control Programme in 1953, as a part of the health development side of the First Five Year Plan. The programme was launched with the assistance of international agencies like the U.S. Technical Cooperation Administration, UNICEF, the W.H.O. and the Rockefeller Foundation.

The progress of the scheme in India is shown in Table 1.

Table 1—Showing the Number of National Malaria Control Programme Units and the Population Protected an India during the Year 1953-1957

Year	No. of N.M.C.P. Units	Population protected (in million)
1953-54 ...	84	52·77
1954-55 ...	110·75	79·89
1955-56 ...	134·25	111·69
1956-57 ...	169·25	145·25

In Uttar Pradesh 20 National Malaria Control Units were established under the National Malaria Control Programme. Each unit covered a population of one million. The Malaria Control work in the State continued till March, 1958. The progress in respect of Malaria Control in Uttar Pradesh is shown in Table 2.

The death rate from malaria which was 10·71 per 1,000 population in 1947 fell down to 0·78 per 1,000 of population in 1958. Some of the districts which had a spleen rate of nearly 70 per cent in 1953 had a rate of only 2-3 per cent in 1959.

Change from Control to Eradication

The experiences of large scale malaria control programmes in malarious areas of different parts of the world, however, necessitated a reorientation of our policies. The first factor responsible was knowledge gained about disappearance of malaria parasites in the

* World Health Day Theme for 1960.

TABLE 2—SHOWING PROGRESS OF MALARIA CONTROL IN UTTAR PRADESH

Year	No. of persons protected (in crores)	No. of villages covered
1947 ...	0·0063	114
1948 ...	0·0063	114
1949 ...	0·0081	411
1950 ...	0·0081	604
1951 ...	0·0081	708
1952 ...	0·458	7814
1953 ...	0·824	16364
1954 ...	0·824	16364
1955 ...	0·824	16622
1956 ...	1·642	30074
1957 ...	2·04	37386
1958 ...	4·02	68159

human host in population which has been effectively protected against new infection for a period of at least 3 years. The second factor was the demonstration of the phenomenon of resistance which malaria carrying mosquitoes in some areas developed against the insecticides in use. While the first factor demonstrated the possibilities of eradicating the disease, the second factor stressed the urgency of action.

This change in concept from malaria control to eradication was given effect to in India in April 1958 and was designed to protect 300 million people living in various parts of the country irrespective of the degree of malariousness to which they were exposed. Under this programme, 67 National Malaria Eradication Programme Units have been established in Uttar Pradesh covering the total population of the State.

The objective of the Programme is to achieve eradication of malaria by the end of Third Plan Period. It must be distinctly understood that the Malaria Eradication Programme aims at eradication of malarial parasite from human blood and not at eradication of mosquito population. Advantage is taken of the peculiar bionomics of the female Anopheline mosquitoes which rest on a wall soon after they have bitten a human reservoir of infection. A layer of residual insecticide spray is spread on every available wall so that when the female Anopheline mosquito rests on it, it imbibes a lethal dose of the insecticide and succumbs to it. Of more than a hundred varieties of mosquitoes, our attack is directed only against 6 to 7 specific species of the female Anopheline mosquitoes which are responsible for transmission of malaria in India. It will, therefore, be understood that although we will be able to achieve the end point of malaria transmission, yet there may not be any proportionate decrease in the mosquito population.

PHASES OF MALARIA ERADICATION PROGRAMME

The whole eradication programme has been divided into four phases, viz., (1) preparatory phase, (2) attack phase, (3) consolidation phase, and (4) maintenance phase.

(1) *The preparatory phase*, which lasts for a year, comprises of the following important steps, viz., (a) Initial survey; (b) Preparation of plans; (c) Preliminary preparations.

(2) *The attack phase* begins as soon as the preparatory phase ends and lasts for about 3 years. This is the period during which not only every structure in the country is sprayed with residual insecticides once, twice or thrice in a year depending upon the degree of prevalence of malaria and the duration of the transmission season, but also periodical assessment of results is carried out to find what remains to be done rather than what has been achieved. The attack phase in our State commenced in 1958 and should end by 1961 by which time the transmission of the disease would have been considerably interrupted. Evidently this phase cannot be extended because of the impending development of resistance by the mosquitoes which carry malaria. Once a house is missed the operations may fail and the objective is defeated.

(3) *The consolidation phase* begins with the ending of the attack phase. Detection of malaria cases and administration of treatment to them will be carried out by active and intensive 'Surveillance' in this phase. All cases of fever will have to be notified so that the patients could be examined for presence of malarial parasites in their blood. Those found infected will be immediately treated for malaria. The malarial parasites must be chased out once for all. When there is no person harbouring malaria parasites in his or her blood, mosquitoes will not be able to transmit it even though they may be sucking blood.

(4) *The maintenance phase* starts when, after 3 years of the consolidation phase, active surveillance has brought no new indigenous cases of malaria to light. Now the regular set up of the health department will be able to look after the anti-malaria activities as a normal part of their job. The disease will continue to remain notifiable and these new cases will be treated as a matter of routine.

HOW WE CAN SUCCEED

The success of the eradication programme depends upon several factors and important ones are availability of adequate funds, provision of adequate number of trained personnel, the sincerity on the part of workers in the field, efficient and effective supervision, assessment of results at regular intervals and last but not the least *enlistment of full cooperation of the people*. Currently the anti-malaria operations in the State are in the attack phase. It is imperative that, a complete coverage of the superstructures, each house, each hut and each room, must be attained with the insecticides. People must be fully aware of this situation and must cooperate in letting the antimalaria gangs accomplish the task. Any postponement of spray and of the extension of cooperation may lead to very serious consequences. It would not only be in national interest but also in the interest of every individual and his family to help and cooperate in this programme so that this age old arch enemy of mankind is made extinct from the world. Without people's cooperation this would not

be possible. The staff of the anti-malaria operation will approach each house in the State and their work is planned in a manner as will not enable them to revisit a house which was found locked or was refused spray. During the surveillance phase when a drop of blood will be needed from children and patients of fever for examination purposes, more and more cooperation of the people will be vitally needed. This programme could meet success only when people realise the havoc that is caused by malaria and become aware of the objects and methods of malaria eradication and cooperate fully in its implementation.

Malaria Eradication—a World Challenge and a Profitable Investment

The eradication of malaria is a challenge to all the World. In an era when man thinks he is about to set foot on the moon, he should on his own planet be capable of stamping out one of his oldest and most destructive enemies.

Dr. Emilio Pampana, who was W.H.O.'s first Director of Malaria Eradication, says "as soon as malaria has disappeared, new settlers appear and begin to work the fertile land that was formerly uninhabitable. Their arrival acts like an injection of energy, a transfusion of new blood, on the unhappy populations who had clung to the malaria-infested land that no one ever thought of claiming from them."

Any investment on the malaria eradication at this stage is an extremely profitable business, and it has been worked out that it will yield 30 per cent dividend every year on the successful conclusion of the programme.

A nation's health is a nation's asset, but dividends need investment.

PUBLIC HEALTH SERVICES IN U.S.S.R.

Prof. V. M. ZHDANOV

Deputy Minister of Public Health of the U.S.S.R.

The death rate in the country in 1913 was 30·5 per 1,000 of the population; today it is no more than 7·5-7·7. Child mortality decreased in this period from 273 to 40 per 1,000 new-borns. The average life span which in 1913 was 34 years has doubled and is to-day 67 years. The USSR now has the most favourable indices for birth-rate for increase in population, as compared to many advanced countries of the West.

These indices are the result of general improvement in the well-being of the Soviet people, the rise in their culture and the tremendous work put in by the workers of the health services during the years the Soviet state has been in existence.

After the victory of the October Revolution, health services had to be built up anew. The entire population of the vast country prior to the Revolution was attended by only 23,000 doctors and 50,000 junior medical personnel concentrated chiefly in the cities. There were very few hospitals with only 1·3 beds to a thousand of the population. One of the main tasks therefore was to establish a network of hospitals and clinics and train medical personnel. Today there are more than 1,500,000 hospital beds; general and specialised hospitals, polyclinics and health centres are to be found all over the land. Some 360,000 doctors and more than one million medical workers are engaged in public health institutions while the medical colleges train annually as many doctors as there were throughout tsarist Russia.

Mass scale development of medical science—Pre-revolutionary Russian medical science made no small contribution to the promotion of world medicine. But it was only in the years of Soviet government that medical science really developed on a mass scale in all its branches. It was precisely in these years that I. Pavlov, E. Pavlovsky, K. Skryabin, A. Bakulev, and the numerous scientists of the younger generation, enriched medicine by their great discoveries. Scientific researches are now being conducted in 90 medical and pharmacological institutes, and about 300 scientific-research institutes are engaged in special fields of medicine.

As regards the medical industry, it actually did not exist before the Revolution, and medicines and medical equipment were mostly imported. Today the Soviet medical industry supplies the health institutions with all kinds of medicines and equipment. Many new medicines and medical instruments developed in the USSR have become world-famous.

Prophylaxis—major principle of Soviet medicine—The major principle of Soviet health protection is prophylaxis of diseases. This principle is reflected in extensive measures directed towards removing the causes of social occupational and infectious diseases, and in particular ensuring the health of mother and child, and in measures for health education and enlightenment.

The emphasis on prophylaxis, on prevention, does not mean that the role of medical treatment is minimised. On the contrary, prophylactic work develops in close relation with medical treatment.

Prophylactics include not only the work of medical institutions, they consist, if one may say so, of non-medical and medical prophylacties. Let us take malaria as an example. At one time it was a difficult problem to combat this disease since large areas in the country were malaria infested, and every year millions of people suffered from this disease. Chemical prophylactics—destruction of mosquitoes with the help of DDT and other chemicals—played an important role in combating this disease. Malaria was quickly eradicated because leaders of enterprises and institutions joined in these efforts, while sanitary inspection organs ensured effective control over the fulfilment of measures for preventing the breeding of mosquitoes. In the areas where dams and other hydrostructures were built, malaria not only did not spread but was even eradicated earlier than in other places, since these construction projects were a powerful factor in clearing the locality of malaria.

The example of malaria shows how successful is the combination of non-medical (public) prophylactics and medical prophylactics. Following this principle the Soviet health services achieved important successes in

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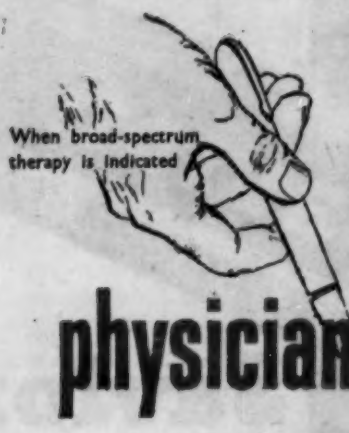

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fighting many occupational and infectious diseases, some of which have disappeared altogether.

Mass prophylactic examinations—Prophylactic medical examinations and regular medical examinations of groups of the population have tremendous importance in the system of prophylactic measures of the Soviet health services.

There is no need to prove that any disease lends itself to treatment far better if it is detected at a very early stage. Prophylactic examinations, which are carried out in the USSR in a planned and systematic manner, conform to this very aim. Certain occupational groups of the population, aged people, particularly women, the inhabitants of certain localities are subjected to such examinations. Every year about sixty million people are subjected to various kinds of prophylactic medical examinations, which reveal initial forms of cancer, high blood pressure, functional disorders of the organism. Patients receive surgical, therapeutic or sanatorium treatment.

Sanatoriums and rest homes—In the Soviet Union, great significance is attached to sanatorium treatment and organisation of rest and recreation of the people, as an important health-building measure. Sanatoria and rest homes, where every year more than three million people undergo treatment and spend their holidays, are situated in various parts of the country where the climate is salubrious, or where natural mineral springs exist.

Finally, we might note the extensive work conducted in the U.S.S.R. to protect the health of mothers and children. The mother and child consultation centres which are organised all over the country pursue this purpose. Expectant mothers are under observation from the first months of pregnancy; they are given advice and consultation, and after the birth of children they are well looked after. There is no doubt that the sharp decline in the death rate achieved in the post-war years is largely due to the work of these institutions.

Vast development envisaged in near future—The Soviet health services will be greatly developed under the current Seven-Year Plan. A large number of hospitals, with half a million beds, will be built. Accommodation for more than 800,000 children will be made available in the new kindergartens. Production of medical goods will increase on an average by three times, and that of more effective medical preparations and new medical instruments—four or five times. In 1965 the number of doctors in the country will reach 500,000 and the junior medical personnel—1,500,000.

The Soviet health services are faced with new and big tasks in the seven-year period. These briefly are: an offensive against such infectious diseases as influenza, poliomyelitis and measles, improvement in the measures for combating cardiovascular diseases and cancer and care of children. The practitioners expect the scientists during these years to enrich our medicine with new effective prophylactic means and means of treatment of diseases.

To protect the health of the people is a difficult but a great and honourable task, to which all the activities of Soviet health services are directed.

CANCER PROPHYLAXIS IN THE U.S.S.R.

PROF. NIKOLAI BLOKHIN

Director, Institute of Experimental and Clinical Oncology, Corresponding Member, U.S.S.R. Academy of Sciences

Somehow a very wrong opinion has prevailed, that the cancer problem is almost wholly obscure, that cancerous diseases are at present incurable, and that the only hope lies in the immediate discovery of a universal medicine or some kind of panacea for cancer. There are many obscure and controversial aspects of the cancer problem and thousands of scientists all over the world, including the U.S.S.R., are studying the origin of cancer, and are searching for the most effective means of its treatment and prophylaxis. Their researches have already yielded positive results.

The scientists working in various research laboratories are now able to artificially induce various kinds of human tumours in experimental animals. These tumours can be induced by applying what are known as cancerogenic chemical substances to animals. Among the strongest cancerogens are the polycyclic hydrocarbons, i.e., the products of incomplete combustion of coal. Continuous exposure to ionising radiation also causes malignant tumours. Thus, tumours appear on animals subjected to prolonged x-ray, radium and isotopes irradiation.

In some cases the tumours in animals are caused by ultramicroscopic viruses, but most oncologists hold the view that not all tumours are due to viruses, and that various diseases, summarily classified under the name of cancer, can be due to different causes. They have a number of common symptoms. These tumours appear without visible causes, they show unrestrained and disorderly growth and infiltrate into the adjacent organs and tissues. In infiltrating into the lymphatic and the blood vessels, the tumour cells detach from the maternal tumour and are conveyed with the blood and lymph stream to remote areas of the organism, where they form new tumour nodes (metastases).

Early detection—Malignant tumours never appear in absolutely healthy tissues—they develop against a background of the so-called precancerous processes. The latter do not always change into cancer but serve as a basis on which it may develop. Therefore, the most effective means of prophylaxis is to detect the precancerous disease as early as possible and to begin its treatment effectively. Mass prophylactic oncological examinations of the population are systematically carried out by the medical institutions of the Soviet Union. They enable physicians to detect precancerous conditions for necessary therapeutic measures. The detection of malignant tumours, at the early stages when it is still possible to cure them completely, is of fundamental importance to cancer prophylaxis.

Prophylactic examinations are all the more important as many tumours often develop with only slight symptoms, and as such many patients seek medical aid too late, when there is not much chance of curing them.

Network of oncological centres—The main establishment in the Soviet Union for combating cancer is the

oncological centre which includes a polyclinic and a hospital. There are 220 oncological centres located in the regions, cities and districts of the Soviet Union. They represent a powerful therapeutic-prophylactic system for the fight against cancer.

The Soviet medical workers conduct a constant educative campaign with the object of drawing the attention of the people to early cancer and pre-tumour symptoms and inducing them to seek timely medical advice. Unfortunately however cancerous diseases in their early stages have few symptoms and are utterly painless. The fate of a cancer patient thus largely depends on the detection of the disease at an early stage.

There is little doubt that cancer is curable if detected early. Thousands of persons are hale and hearty today but many years after they may get cancer. External forms of cancer are the easiest to detect and treat. At present 95 per cent of the patients with cancer of the skin can achieve full and stable cure. Considerable success has also been achieved in the treatment of cancer of the uterus, of the mammary gland and of other organs.

Even cancers of such deeply located organs as the stomach, lungs and osophagus—the most difficult to detect and cure—have become amenable to treatment. Surgical intervention is of primary importance in such cases. Other methods of therapy, such as x-rays, radio-isotopes, etc., are finding greater application.

Drug treatment of cancer—Medicinal methods of treatment of tumours are gradually and steadily penetrating into oncological practice. Medical scientists are developing new methods of treating certain tumours with hormonal preparations. At the same time research work on anti-tumour antibiotics is being conducted. A number of chemical preparations have been developed for treating tumours.

We are not speaking of the search for a universal anti-cancer remedy, but of the quest for a number of medicines which would help in the treatment of different tumours. Experimental observations and clinical research reveal that anti-tumour preparations are usually active with regard to a specific tumour.

The Soviet state pays great attention to the fight against cancer. Large scientific-research oncological institutions are working in many of the cities of U.S.S.R. Work on cancer problem is being done not only by medical workers, but also by chemists, physicists and biologists. All this enables us to hope that medical science will obtain new methods and means of prophylaxis and treatment of cancer in the nearest future.

NOTES AND NEWS

Pacific Science Congress

The Tenth Pacific Science Congress of the Pacific Science Association will be held at the University of Hawaii, Honolulu, from 21 August to 6 September 1961, sponsored by the National Academy of Sciences, Washington, D.C., and Bernice P. Bishop Museum, with the co-operation of the University of Hawaii. Scientific sessions will be held from 21 August to 2 September, with a post-sessional field trip through 6 September.

The Pacific Science Association is an international, regional, non-governmental scientific organisation, founded in 1920 by the holding of the First Pan-Pacific Scientific Conference in Honolulu. The Association's permanent headquarters is at the Bishop Museum, Honolulu 17, Hawaii, U.S.A.

Each Pacific Science Congress is held under the auspices of the organisation which represents the Pacific Science Association in the host country. At its meetings during the Ninth Congress, the Council of the Association accepted the joint invitation of the National Academy of Sciences and Bernice P. Bishop Museum for the Tenth Congress to meet in Hawaii in 1961. This invitation was offered with the full co-operation of the University of Hawaii, on the campus of which the meetings will be held. Officers of the Congress and programme organisers are appointed by the organisations under whose auspices the Congress is held, and the administrative expenses of the Congress are defrayed by these organisations.

The officers of the Congress are: Honorary President: Detlev M. Bronk, President, National Academy of Sciences; President: Laurence H. Snyder, President, University of Hawaii; Honorary Vice-Presidents: A. P. Elkin. The University of Sydney, Australia; Koji Hidaka, Tokyo University, Japan; C. R. Pemberton, Hawaiian Sugar Planters' Association, Experiment Station, Hawaii; Knowles A. Ryerson, University of California, U.S.A; Air Marshal Muni M. Vejyant-Rangsrisht, Chulalongkorn University, Thailand; Secretary-General: Harold J. Coolidge, Executive Director, Pacific Science Board, National Academy of Sciences.

The programme is being organised under Sections and Divisions. Symposia are the main divisional meetings, but provision is also being made for sessions of grouped papers and sessions of contributed papers. In addition to sectional and divisional programme there will be a limited number of special symposia of broad general interest.

National Nutrition Advisory Committee

The Food and Agriculture Organisation (F.A.O.) in their Conference held in November, 1957, at Rome recommended that Member Governments—

1. take due account of the nutritional needs of their populations in formulating and implementing policies and plans relating to food production and consumption, including international trade in food;

2. establish, where these are needed, national nutrition organisations, providing them with adequate authority and means to influence such policies and plans, or make other appropriate arrangements to achieve the same objective; and

3. to include in their periodic progress and programme reports to F.A.O. an account of the steps taken to raise the levels of nutrition and the progress achieved

The Government of India have accordingly decided to establish a National Nutrition Advisory Committee with the following composition—

Chairman—Union Minister of Health; *Pro-Chairman*—Union Minister of Agriculture; *Members*—Shri V. K. S.

Pillai, Secretary, Ministry of Health, New Delhi; Prof. M. S. Thacker, Secretary, Ministry of Scientific Research and Cultural Affairs, New Delhi; Director General of Health Services, New Delhi; Dr. C. O. Karunakaran, Retd. Director of Public Health Laboratories, Leela Vilas, Trivandrum (Kunnukuzhi); Dr. N. B. Kabbur, Malmaddi, Dist. Dharwar; A representative of the Ministry of Food and Agriculture; A representative of the Ministry of Commerce and Industry; A representative of the Ministry of Community Development and Co-operation; A representative of the Ministry of Education; Dr. B. C. Guha, head of the Department of Applied Chemistry, University College of Science and Technology, Calcutta; Dr. S. T. Achar, Director, Institute of Paediatrics, Madras Medical College and Government General Hospital, Madras; Dr. K. Mitra, C.I.T. Plot No. 114 Badan Roy Lane, Calcutta; Dr. V. N. Patwardhan, Director, Nutrition Research Laboratories, Hyderabad; Dr. V. Ramalingaswami, Professor of Pathology, All India Institute of Medical Sciences, New Delhi; Dr. V. Subramanyam, Director, Central Food Technological Research Institute, Mysore; Dr. M. V. Radhakrishna Rao, Assistant Director, In-charge of Department of Nutrition, Government of Bombay, Haffkine Institute, Bombay; Dr. H. P. Nath, Defence Science Organisation, Ministry of Defence, New Delhi; *Secretary*—Dr. C. Gopalan, Deputy Director, Nutrition Research Laboratories, Hyderabad; *Jt. Secretary*—Dr. (Miss) Radha Karnad, Directorate General of Health Services, New Delhi.

The members of the Committee will hold office for a term of three years.

W.H.O. Executive Council

The World Health Organisation (WHO) assembly at its meeting in Geneva on May 11 elected Argentina, Britain, Ghana, South Korea, Jordan and Thailand to the organisation's Executive Council for 1961. The Executive Council is composed of 18 members one-third of which is elected annually.

Smoking Involves Risk to Health

Investigations carried out so far in India on the direct relationship between smoking and lung cancer indicate that smokers are at a greater risk than non-smokers, the risk increasing with the number of cigarettes smoked.

The problem of lung cancer, it appears, is not of a big magnitude in the country. Of 36,505 patients who attended the Tata Memorial Hospital during 1941-50, only 521 (1·43 per cent) were suffering from lung cancer.

An investigation conducted by the Indian Cancer Research Centre in Bombay among 1,460 patients admitted to the Tata Memorial Hospital during 1952-54, revealed that the habit of chewing was significantly associated with cancer of the mouth, of chewing and smoking with cancer of the back of the tongue and the upper part of the pharynx, and of smoking only with cancer of the upper part of the gullet and the adjoining portion of the pharynx. It was possible that cancer of the lung escaped detection and was diagnosed as some other disease of the lung or the adjacent organs.

According to an official Press release, a recent survey of 34,000 healthy men over 30 years of age in Maharashtra, Gujerat, Uttar Pradesh and Andhra showed a significant association of some precancerous changes with smoking and chewing tobacco. Evidence supporting the cause and effect relationship between tobacco-smoking and oral cancer, has come from certain parts of eastern India where cancer of the palate was found among people smoking cigars (chutta) with the lighted end in the mouth.

In India smoking of cigarettes is confined mainly to urban areas. The modes of smoking among the rural people are hookah, chilum or bidi. Smoke inhaled from the hookah and the chilum is filtered through water or a wet piece of cloth and harmful substances in smoke do not probably enter the mouth and respiratory passages. In the case of bidi, it is likely that particles of smoke do not reach the bronchi and lungs and are deposited at the back of the tongue and the upper part of the throat.

Smoking involves hazards to health, and leads to conditions such as sore throat, coughing, lack of appetite and bronchitis. At times bronchitis may become chronic and cause serious diseases of the lungs.

Studies in the U.K. and the U.S.A. have led to the conclusion that there might be close relationship between heavy smoking and lung cancer. Latest authoritative evidence supporting the conclusion is contained in the report of the Medical Research Council of Great Britain.

In the United States over 25,000 persons died of lung cancer in 1956 and the number is increasing by over 2,000 every year. It has recently been noticed that 11·4 per cent of all cancer in men and 2·1 per cent in women can be diagnosed as cancer of the lung.

Epidemiological surveys, clinical studies and experimental investigations conducted by the American Cancer Society, have brought out that incidence of cancer of the respiratory tract is greater in persons who smoked many cigarettes daily than in those who abstained from smoking. Among pipe smokers the incidence of lung cancer is almost the same as in persons who do not smoke at all. It is slightly higher in those who smoke cigars.

Reorganisation of Medical Colleges in Mysore

The Government of Mysore have ordered reorganisation of the three Government Medical Colleges in the State at a total cost of Rs. 22,68,758 per annum. The extra cost involved in this organisation is Rs. 8,68,758.

The Government, on the recommendations of Maj.-Gen. S. L. Bhatia with regard to medical education in Mysore State, recently passed orders sanctioning standard staff for non-clinical departments, as laid down by the Indian Medical Council, with uniform pay-scales and non-practising allowances involving an expenditure of Rs. 9,68,758 and entailing an additional expenditure of Rs. 2,64,860 per annum.

With reference to the standards and patterns of staff laid down by the Indian Medical Council in respect of full-time teaching units in the Government Medical Colleges with an admission capacity of 100 students,

Government have now sanctioned 13 full-time teaching units—three each in Medicine and Surgery, two in Obstetrics and Gynaecology, and one each in Ophthalmology, E.N.T., Anaesthesiology, Radiology and Dermatology and Venerealogy and two half units, one in Paediatrics and the other in Orthopaedics. They have also sanctioned a central clinical laboratory, a department of blood bank, a department of Forensic Medicine and special courses of lectures in other clinical subjects like Dentistry, Tuberculosis, Mental diseases, Infectious diseases, Physiotherapy, Rehabilitation and Psychiatrics.

The total cost of the staff sanctioned for clinical subjects is Rs. 13 lakhs. The extra expenditure involved is Rs. six lakhs per annum.

Each unit will consist of one Professor, one Assistant Professor, one Lecturer, one Registrar, and two Housemen. Each half-unit will consist of one Assistant Professor, one Lecturer and one Houseman. One unit in each of the departments of Medicine, Surgery, and Gynaecology is whole-time, with no private practice. The other ten units and two half-units will be whole-time with limited private practice.

There are at present three Government Medical Colleges in the State, at Bangalore, Mysore and Hubli. The Government have now ordered introduction of full-time units in clinical subjects as laid down by the Indian Medical Council.

New 650-Bed Hospital in Delhi

The Rockefeller Foundation and the U.S. Technical Co-operation Mission have given grants to the All-India Institute of Medical Sciences in New Delhi for building a new 650-bed hospital in the capital.

The Rockefeller Foundation grant amounting to $500,000 will defray the current foreign exchange costs. It is learnt that assurances have been given that the Foundation will sympathetically consider any request for additional funds if and when further foreign exchange is required for developing the new hospital into a teaching institution.

The grant from the T.C.M. amounts to over Rs. 290 lakhs towards the entire local construction costs. This money which will be in Indian rupees is from Pl 480 funds.

The new hospital, which will be one of the most modern in this part of the world, will have facilities for 3 basic functions, patient care, teaching and research. The hospital will be an integral part of the All-India Institute of Medical Sciences which was established by an Act of Parliament in 1956. The Institute, when completed, will provide for under-graduate and post-graduate teaching in medicine and other allied sciences.

500-Bed Tuberculosis Hospital in Calcutta

Work is expected to begin shortly on the construction of what is expected to be one of the biggest and most modern tuberculosis hospitals in Calcutta where the shortage of beds for patients has been a serious problem. The hospital, which will be free, will be run by the Corporation of Calcutta. The Corporation runs a number of maternity hospitals but it has no general hospital under its control.

Reduction in Cinchona Acreage

The Government of Madras have decided to reduce the acreage under cinchona from the present extent of 9,600 acres to 8,000 acres, spread over Anamallais and Nilgiris. This decision is the result of the fall in demand for quinine brought about by the success of the National Malaria Control Programme.

Inclusion of Medical Licentiates in the Graduates' Constituencies

As per Home Department notification No. 2-A.R. dated the 2nd January, 1960 published in the Calcutta Gazette, Extraordinary Part 1, dated the 2nd January, 1960, the following qualifications of medical licentiates have been specified to be deemed equivalent to that of a graduate of an Indian University for the purpose of election to the Legislative Council of West Bengal in the Graduates' constituencies namely :

1. Degree or Diploma in Dentistry issued by the State Medical Faculty, Bengal, Calcutta, if granted after 31st December, 1939.
2. Certificate of L.M.P. or L.M.F. issued by the State Faculty of Medicine, West Bengal.

REVIEWS

Modern Practice in Immunization—By D. D. Banker, M.D., PH.D. 1960; Published by the Indian Journal of Medical Sciences, Bombay-4; 6¾" × 9¾"; pp. 137; price Rs. 10/-.

The book embodies in a concise form the current knowledge on procedures of immunisation against bacterial and viral infections. The active immunising agents which are used extensively all over the world for prevention of epidemic and sporadic infections have received considerable attention. Those who are anxious to be informed about the modern thoughts on immunisation, but hardly ever have time to read the more elaborate presentations, would find this book quite handy. The book, thus, should be useful to the general medical students and to physicians practising in the field.

D. C. LAHIRI

Outline of Orthopaedics—By John Crawford Adams. 3rd edition, 1960; E. & S. Livingstone Ltd., Edinburgh and London; 8⅛" × 5⅛"; pp. vii+440; 313 figures; price 35s.

In two years, the author has brought out a new edition and perhaps it is a little early and inconsistent with the author's own remark under introduction "Today the tempo of advance has inevitably slowed, after the first great surge of discovery." (page 4).

The book gives an excellent account of the subject. The illustrations are simple and educative. The addition of clinical methods in each chapter makes the volume

specially useful for students. No doubt, the book will be of great help to students and practitioners.

A. K. MUKHERJI

Basic Surgery—Edited by Leslie Oliver, M.B.B.S., F.R.C.S., F.A.C.S.; 1958; H. K. Lewis & Co. Ltd., London, W.C.1; 9¼" × 6¼"; pp. xvi+1360; price £6-6s.

This has been a wonderful collection. The book has been written for the undergraduates but it can be a basic guide for the postgraduates too. A complete surgery in such a small treatise is worth possessing by students; there is hardly a text-book which gives so much up-to-date information in different subjects. The graph shown in the chapter on Bronchial Carcinoma is a treasure and gives the picture of whole of U.K. At the present state of surgical specialities no one person can hope to scope with all subjects. So all surgical guides should adopt this principle of having separate chapters written by specialists in their respective fields. It is a unique collection.

M. MUKHERJEE

Hale-White's Materia Medica, Pharmacology and Therapeutics—By A. H. Douthwaite. 31st edition, 1959; J. & A. Churchill, London; 7¼" × 5"; pp. viii+525; price 25s.

The writing of a text-book of Materia Medica, Pharmacology and Therapeutics would offer formidable difficulties to any author today. The last ten years have seen a remarkable development of new drugs; for the author, however, inclusion of too many of these would add to bulk, while rejection of too many would undermine its reference value. Then there is the difficulty of bridging experimental physiology and pharmacology on the one hand and practical therapeutics on the other. Dr. Douthwaite has tried to strike a balance between these conflicting interests. In fact, despite inclusion of many new drugs, the 1959 edition has increased very little in bulk over the 1949 edition. The mention of doses in both metric and Imperial scales is in keeping with the present trend and the inclusion of the 1958 B. P. dosage is an added advantage.

Since the last edition, new sections have been added on tranquillisers and drugs used in the treatment of paralysis agitans. Instead of a passing reference to nitrogen mustards, there is a full subsection (group 55) on the chemotherapy of malignant diseases. With suramine, pentamidine isothionate is now mentioned. The group of hormonal preparations has been very ably edited by Dr. Bishop.

However, the groups and their arrangement though they are the same as in previous editions leave much room for improvement. For example, cardiac glycosides (group 42) are sandwiched between antibiotics and expectorants, hypotensives (under which veratrum deserved a mention) are considered in a sub-section under ganglion and muscle depressants (group 30) in the midst of various other autonomic drugs, and apparently there is no group devoted to anti-arrhythmic agents. Other examples of such undesirable arrangement could be shown. Drugs used as anti-anaemic agents have no separate group of their own, but are scattered in different groups; e.g., liver extract and vitamin B-12 appear under vitamins (group 52), and iron under metals (group 48). Anti-tubercular drugs appear only as a subsection of the group (39) on chemotherapeutic agents, though streptomycin has to be sought for under antibiotics (group 41); whereas a full group has been devoted to drugs used in leprosy. The group on drugs used in amoebiasis does not show carbarsone which has to be looked for under the group on metalloids. Antimalarials also could have been better discussed. The distinction between competitive and depolarising neuromuscular relaxants has not been laid down very clearly—and in any case choice of the group heading of muscle depressants to denote neuromuscular relaxants is perhaps unhappy. There is no group for drugs affecting the respiratory system nor for drugs affecting water and salt balance. Radiation injuries should have found some place, and the chemoreceptor trigger zone should have been referred to while discussing emetics and anti-emetics.

However, one generally feels that this new publication has maintained the tradition of brevity and clarity of the previous editions.

K. N. SEN

Anesthesia for Infants and Children—By Robert M. Smith, M.D. 1959; C. V. Mosby Co., St. Louis, Missouri, U.S.A.; 10¼" × 6¼"; pp. 425; price $12.

Remarkable progress in paediatric surgery has been made possible by numerous investigations and contributions in the field of anaesthesia for infants and children. And today, we have, in this volume, well standardised procedures, which have been found smooth, safe and sound.

The author has attempted to evaluate the various findings in order to establish a standard, which a newcomer in the speciality can learn and practise with safety. This he has done by examining each problem in its minutest detail, on the basis of a sound background of physics, physiology and pathology.

This book is intended, as the author mentions, for those who are already familiar with the essentials of general anaesthesia in adults but lack the expert knowledge of anaesthesia in infants. And going through the book one will realise and appreciate the oft-quoted remark "Children are not small adults".

The author has very ably and fully discussed the practical problems faced by an anaesthetist while different organs and different systems of an infant are handled by the surgeon. But before that he has probed into the preliminaries and special problems of paediatric anaesthesia. Particular mention should be made of certain chapters, viz., 'Biology and behavior, or factors determining the child's response to anesthesia', 'Respiratory physiology in infants and children' (by Charles D. Cook), where much useful material has been gathered and presented in a very simple manner.

The volume is a very valuable addition to the literature on anaesthesia.

S. PRAMANICK

Outline of Fractures (including Joint Injuries)—By John Crawford Adams, M.D., F.R.C.S.. 2nd edition, 1958; E. & S. Livingstone Ltd., Edinburgh and London; 8½" × 5¼"; pp. 268; price 27s. 6d.

The need for a handy book on fractures and joint injuries with basic principles for medical students overburdened with the widening field of medical sciences, is ideally served by this book.

With 237 remarkable illustrations plus a useful account of all fractures and joint injuries of the extremities and trunk, the volume is best suited for the student in the qualifying examination.

The chapter on general features of fractures comprises pathology of open and closed fracture, complications and clinical investigation with a note on special features of fracture in children as early healing, incidence of incomplete or greenstick fracture, remodelling and difficulty in diagnosis. The principles of fracture treatment are detailed in the next chapter and on the question of acceptable position after reduction, the stress is given, rightly, more on the alignment than on apposition of the fragments.

The joint injuries are briefly described and classified as dislocation, subluxation, strain and contusion.

The chapter on injuries of the spine and thorax is useful. Mention may be made of paraplegia and the schematic diagram on the nature of neurological lesion and the state of bladder after vertebral injury. Intermittent catheterisation by strict aseptic method is advocated in the initial management of spinal cord and cauda equina injuries.

The salient features of recurrent dislocation of shoulder, supracondylar fracture of humerus and Colles' fracture are illustrated nicely. The management of fracture neck of femur, its complications, particularly nonunion, is useful.

A short hip spica applied over protective felt padding, slit vertically when dry and strapped later by an encircling rubber bandage of Esmarch type seems to be a good method for traumatic disruption of pelvis.

Trochanteric fractures of the femur are shown treated by nailplate fixation and traction method devised by Mr. Hamilton Russell of Australia. Single screw fixation of patellar fracture is described and stress is laid, as it should be, on early mobilisation and physiotherapy in crushed fractures as 'bumper fracture' of external condyle of tibia and compression fracture of calcaneus. Thus there are definite views on the management of some fractures in the book and a little dogmatism in the choice of method by an experienced orthopaedic surgeon like the author is welcome and helpful to all concerned.

A summary of treatment follows every chapter, useful to the student and the general practitioner. The book fulfils its aim as set out in the preface. The reviewer however is of opinion that a brief chapter on fractures of skull with head injury and fractures of face and jaw, though tackled by faciomaxillary, plastic and neurosurgery in a specialised way in actual practice, would have been helpful and make the book complete for the undergraduate and the general practitioner.

K. S. Bose

Osteochondritis Dissecans, Loose Bodies in Joints, Etiology, Pathology and Treatment—By I. S. Smillie, O.B.E., CH.M., F.R.C.S. (E.), F.R.F.P.S. 1960; E. & S. Livingstone Ltd., Edinburgh and London; 9½" × 6½"; pp. 224; price 60s. net.

Because of its rarity, aetiological uncertainty, difficulty in diagnosis and definition, biomechanical pathogenesis, crippling deformity and morbidity and the surgical challenge and skill encountered in treatment, osteochondritis dissecans is a fascinating subject.

This monograph is the result of the study by the author of 300 cases in different joints such as knee, ankle, hip and elbow. Though he has not claimed to have solved an age-old problem, the book is an outstanding contribution to the knowledge of its aetiology, pathology and treatment. In aetiology, two types—juvenile and adult—are described. Both are the result of summation of constitutional dysostotic, endogenous and exogenous factors.

Anomalies and accessory centres of ossification and enchondral disorders are manifestations of dysostotic constitution. The endogenous mechanical factor is unusual contact as between tibial spine and infra-lateral aspect of medial condyle of femur in the classical site. The anatomical form and function of joint determine the frequency of occurrence. Repeated trauma caused by tangential force is the main exogenous factor.

These factors in various proportion are also responsible for producing similar ischaemic lesions like Friberg's infarction in metatarsal head, osteochondritis dissecans in elbow (capitellum and head of radius), in ankle and hip where it simulates closedly Perthe's disease.

The basic pathology is ischaemia that affects bone. A horizontal cleavage occurs in the superficial layers of subchondral bone, akin to that seen in the pathology of meniscus tears, followed by ischaemia and sclerosis, formation of a gap and separation of the fragment in the joint. This occurs in joints in which rotation is a salient feature as screw home movement in knee, pronation and supination in elbow, eversion and inversion in ankle.

The author's experience in the management and treatment of the condition is epitomised in "that timely operative intervention can restore the anatomy of the part and result in healing even after separation of the fragment" and "that true spontaneous healing of established osteochondritis dissecans was not observed in the series".

The details of operative technique, drilling and internal fixation by small nails, which the author designates as conservative surgery, are superbly illustrated by colour photographs and prints, along with operative indications, postoperative management, follow-up, complications and future developments of the technique.

The principle in operative treatment of Fiberg's disease which is rare in India is to increase the circulation of the metatarsal head. A case of Perthe's disease of hip (fairly common in India) is described in which the same principle was applied with immediate success. Thus a possible future development in treatment of Perthe's disease is keenly awaited.

The book is a singular achievement for the author.

The publishers are to be congratulated for the excellent get-up.

K. S. Bose

Midwifery 1959—By M. Fensom, S.R.N., S.C.M., M.T.D. Oxford University Press, Calcutta; 8½" × 5½"; pp. viii+96; price Rs. 4·40 nP.

The chapters on normal and abnormal labour, their physiology, diagnosis and management have been dealt with nicely in this volume, impressing on the reader the practical aspect of the problems.

In the section on puerperium—the changes, infections and their prevention have been written in detail. Care of the new-born, premature infants and the sick have been presented from a practical point of view.

Illustrations in the book will be very helpful and educative for the beginners.

This book has been written exclusively for midwives and labour attendants. It is lucid and is easily understood. All the chapters have been well written and every attempt has been made to impart the knowledge of midwifery, in a very simple language, to those for whom it is meant. A book like this will always be in demand.

Elementary knowledge of the pelvis and the organs, so essential for a labour attendant, has been included in the introductory chapters. Pregnancy, both normal and abnormal, has been elaborately described with diagnosis and treatment, helpful for the midwives and nurses.

D. Ghosh

Angiologie : Pathologie, Klinik und Therapie der peripheren Durchblutungsstörungen—Herausgegeben von Prof. Dr. M. Ratschow, F.A.C.A., Darmstadt. Unter Mitarbeit von zahlreichen namhaften Spezialisten. 1959. XXIV, 831 Seiten, 373 zum Teil farbige Abbildungen in 496 Einzeldarstellungen, Lex.-8°, (Georg Thieme Verlag, Stuttgart), Ganzleinen DM 174.

Angiology : Pathology, Clinic and Therapy of Peripheral Circulatory Disturbances—Ed. by Prof. Dr. M. Ratschow, F.A.C.A., Darmstadt, with the collaboration of numerous renowned specialists (in German). XXIV, 831 pp. 373 partly coloured illustr. in 496 figures. Georg Thieme, Stuttgart, 1959. DM 174.

The editor, an internationally recognised authority on this subject, realised for the first time since 1938, when his monograph on peripheral circulatory disturbances was first published, that the progress in this subject is too fast and extensive to be fully mastered by a single author. So he formed a team consisting of 8 of his former assistants and 17 other experts, including an Egyptian for the chapter on elephantiasis, and created this monumental volume to which a conventional review can do no justice. Every chapter is a mine of information, be it on the history of angiology, on normal and pathological anatomy of blood vessels, physiology and pathology of peripheral circulation, aetiology and pathogenesis of vascular disorders, on diagnostic and therapeutic methods in general, or be it anyone of the four chapters into which "special angiology" is divided; each of them is complete, up-to-date, profusely and superbly illustrated and concluded by a long list of references taken from every language on earth. By careful editing overlapping has been reduced to a minmum and where it occurs it seems to be there on purpose to present a variety of authoritative opinions on controversial subjects. The production of this new standard work is beyond praise; reading has been facilitated by adopting the double-column page. In spite of the many good books on this subject in English language, a translation of this model encyclopaedia should be most welcome to every branch of medical science in the widest sense.

Robert Heilig

OBITUARY

Sir Robert McCarrison

Major-General Sir Robert McCarrison who was an honorary physician to King George V, died in Oxford on May 19, 1960, at the age of 82.

By the death of Maj.-Gen. Sir Robert McCarrison, the medical world loses one of its most eminent physicians and research workers. The best years of his life were spent in India when he made striking contributions to medical science, particularly in regard to nutrition, goitre and cretinism. His research work and generalisations on deficiency diseases form the basis of most of the later work in this direction in many countries of the world. "Faulty diet and dirt," he once said, "are the two great causes of illness, and they are partners in crime."

Major-General Sir Robert McCarrison, Kt., C.I.E., M.D., B.Ch., B.A.O., B.Sc., F.R.C.P., LL.D., M.A., late I.M.S., was born on May 15, 1878, and educated at Queen's College, Belfast, and Richmond Hospital, Dublin. He received the C.I.E. in 1923 and was knighted in 1933.

He entered the I.M.S. in 1901; was Agency Surgeon, Gilgit, Kashmir, 1904-11; Milroy Lecturer, Royal College of Physicians, 1913; undertook the investigation of goitre and cretinism in India, 1913-14, and deficiency diseases, 1918-35, under the Indian Research Fund Association; was recipient of the Prix Amussat, Academy of Medicine, Paris, 1914; was on active service 1914-17; recipient, Stewart Prize, British Medical Association 1918, Arnott Memorial Gold Medal, Irish Medical Schools and Graduates' Association, 1922, Arnold Finker Prize, Vienna, 1934 and Barclay Memorial Medal, R.A.S., Bengal, 1939.

Retiring from the I.M.S. in 1935, he lectured widely in the U.S.A. From 1939 to 1955 he was at Oxford University, the last ten years as Director, Post-graduate Medical Education.

His work in India was widely appreciated and acknowledged. After joining the I.M.S. in 1901 he spent two years in Chitral (1902-4), where he proved that Chitral Fever was not malaria but a definite entity. From Chitral he went to Gilgit, where he began a series of observations and experiments which attracted immediate attention. Here he studied goitre, cretinism, deaf-mutism and endemic tetany.

Then, in 1911, he left Gilgit on furlough to England, where he was invited to deliver lectures at the Royal College of Physicians in London (1913). These lectures were published in book form and are still an excellent resumé of the knowledge on goitre. He returned to India in 1913 and began work with the Indian Research Fund Association, a connection which was maintained uninterruptedly until 1935. He first worked at Kasauli on goitre and tetany, where he was able to produce goitre in animals in experimental conditions and, what was more important, congenital goitre and cretinism in their offspring.

It was during this period at Kasauli that Sir Robert began his study of dietary, with which his name was widely associated. Then came World War I in 1914. He returned to India in 1918 and was posted to Coonoor, where he again began his work on nutrition. His research work threw a flood of new light on the subject of deficiency diseases. Hitherto the study had been mainly clinical. Sir Robert instituted a new principle by undertaking complete postmortem examinations of deficiently fed animals. He established that faulty and ill-balanced diets lowered resistance and made one easily susceptible to disease. His little book on *Food* was a gift to the children of India and it has now been translated into many Indian languages. His work in India was abiding and inspiring. His main ambition was to establish an Institute of Nutrition. The Nutrition Research Laboratory started by him at Coonoor still functions and a food technological institute has been set up in Mysore. Another of his aims was that the younger generation of Indian scientists should be given ample opportunity for training and service for the advancement of science in India.

YOUR QUESTIONS

Correspondents should give their names and addresses (not necessarily for publication) and include all relevant details for the questions which should be typed. Questions of medical interest will only be accepted for this section. They should be sent in a separate envelope marked "Your Questions". Questions of general interest will be published in preference. Lack of space precludes answering all the questions received.

ED.—*J. Indian M. A.*

Q. Please let me know if sterility is inevitable in a case of tuberculous endometritis which has been cured with streptomycin and PAS.

Ans. Sterility is not inevitable, provided the tubes or even one tube is functioning. Pregnancy, after the endometrium and the endosalpinx have been functioning normally, has been reported.

Q. Could you possibly enlighten me about the "assessment of the duration of injuries", viz., abrasion, contusion and wounds? As a medical witness in a court of law one is often asked about (a) the duration of an injury and (b) how much it can vary on either side. We generally get cases within less than 24 hours (may be ¼ hour to 24 hours) after infliction.

For injury of less that 24 hours' duration we have insufficient data to guide us. It is difficult to be dogmatic if a wound is 6 hours and not 18 hours old and *vice versa*. On what data can we state that the duration of the wound is, say, of 12 hours. Then comes the question of possible variations in time—12 hours or even 18 hours.

Ans. It is difficult to be dogmatic about the age of wounds. An approximate idea of the time elapsing after the infliction of the injury may be obtained from the following data :

1. *Abrasion*—It bleeds very slightly, and within 5 to 6 minutes a coagulum composed of lymph and blood clots covers the raw surface. Parchmentisation commences by about 12 hours and becomes a well formed hard scab by 24 hours, and final healing is complete by 4 to 5 days.

2. *Bruise*—Immediately within 3 to 5 minutes, due to rupture of blood vessels, the injured part becomes swollen (variations depending upon different sites), purple or black. This colour changes to green in about 3 to 5 days, with associated further gradual changes, finally leading to normalcy by about 2 weeks.

3. *Laceration*—The edges are uneven, so the margins take a long time, usually beyond 36 hours, to be glued up with lymph and blood clots. The soft blood clots can easily be removed within this period by rubbing with a piece of gauze.

4. *Incised wound*—Here the margins are clean-cut and are covered with lymph and blood clots in about 36 hours at the most. When not disturbed, the edges become strongly adherent in about 3 days and undergo the final process of complete healing by 7 to 9 days.

Better confirmatory opinion is possible on the wounds after death. Histological sections can give us a fair degree of accuracy as to the length of time elapsed since the infliction of the injury. This requires an average knowledge of pathology and constant laboratory practice. We can thus have the minimum period for confirmatory evidence or base line at about 12 hours, depending again on the tissue reactions of the deceased. A short summary of tissue changes are given below :

TISSUE CHANGES :

(a) *By 12 hours*—The edges are red, swollen and glued together by blood and lymph. Leucocytic infiltration is fairly marked.

(b) *By 24 hours*—There is proliferation of vascular endothelium and connective tissue with usual characteristic swellings. New capillary buds just take up the functions.

(c) *By 36 hours*—The capillary network is complete.

Regarding the question of expert evidence in law courts, it may be stated that it is not essential for judicial officers to depend solely on the medical opinion. They rather depend upon corroborating evidences to fix up the approximate time of assault.

ERRATUM

Vol. 34, No. 8, April 16, 1960 issue : Under OBITUARIES in page 332, Col. 1, the last line under heading Dr. Charu Chandra Banerjee should read : *Dr. Banerjee passed away on December 17, 1959.*

INDIAN MEDICAL ASSOCIATION

THIRD STUDY TOUR TO EUROPE FOR MEMBERS ONLY

(AUTUMN—1960)

The I.M.A. is once again planning a study tour of Europe for its members. Benefiting by our experience from the last 2 tours (1956 & 1959), we have completely changed the pattern of the tour. This year, instead of it being a "Study-cum-Pleasure" or rather a "Pleasure-cum-Study tour", it will essentially be a study tour, sightseeing and social functions being arranged during the spare hours only. The itinerary will be carefully planned and the tour will be run at the most economic rates.

Autumn (August-October) has, as in the past, once again been chosen for the tour, since during summer, many of the members of the profession in Europe are away on holiday and several medical centres are closed. Besides, climatically, autumn is more suitable than any other part of the year.

The tour will offer an educative and interesting programme of study in some of the famous medical institutions in the countries that are proposed to be visited, as also an opportunity to meet wellknown specialists and fellow doctors at work and socially, in those places.

The tour is being arranged through M/s. Air India International and the study contents are being worked out in collaboration with the respective National Medical Associations, pharmaceutical manufacturing concerns and government authorities of the countries to be visited, which are:

U.S.S.R.	Sweden	England	France	Germany	Austria	Switzerland	Italy
(8 days)	(3 days)	(6 days)	(2 days)	(11 days)	(5 days)	(4 days)	(3 days)

The tour is scheduled to commence on Monday the 22nd August 1960 *ex* Bombay and on Tuesday the 23rd August 1960 *ex* Delhi and will terminate on Friday the 7th of October 1960 in Bombay.

The inclusive tour cost is Rs. 6,700/- per participant. *(Only members of the Indian Medical Association may participate in the tour and wives or husbands or children of the members cannot join the tour).*

According to the terms of the permit granted by the Government of India, the limit of number of participants is restricted to 60 doctors only.

The above price has been worked out on the basis of the prevailing international air fares and not on charter basis. Further, it does not include items such as passport fees, endorsements and visa fees, laundry, excess baggage charges, cost of extra meals, drinks, bath facilities in the hotels and any other items of a personal nature. Supplements for bath facilities will have to be paid for directly by the participants to the hotels in Europe.

This is an approximate cost, subject to minor adjustments with hotels, etc. The exact cost will be intimated after arrangements for the accommodation, etc., have been finalised.

The Indian Medical Association has appointed M/s. Trade-Wings Private Ltd., 30/32, Rampart Row, Fort, Bombay, in the capacity of Travel Agents, to look after the technical arrangements of this tour.

Members should forward their requests to the undersigned in a cover marked "Study Tour" latest by the 30th of June, 1960.

Sd/- A. P. MITTRA
Honorary General Secretary
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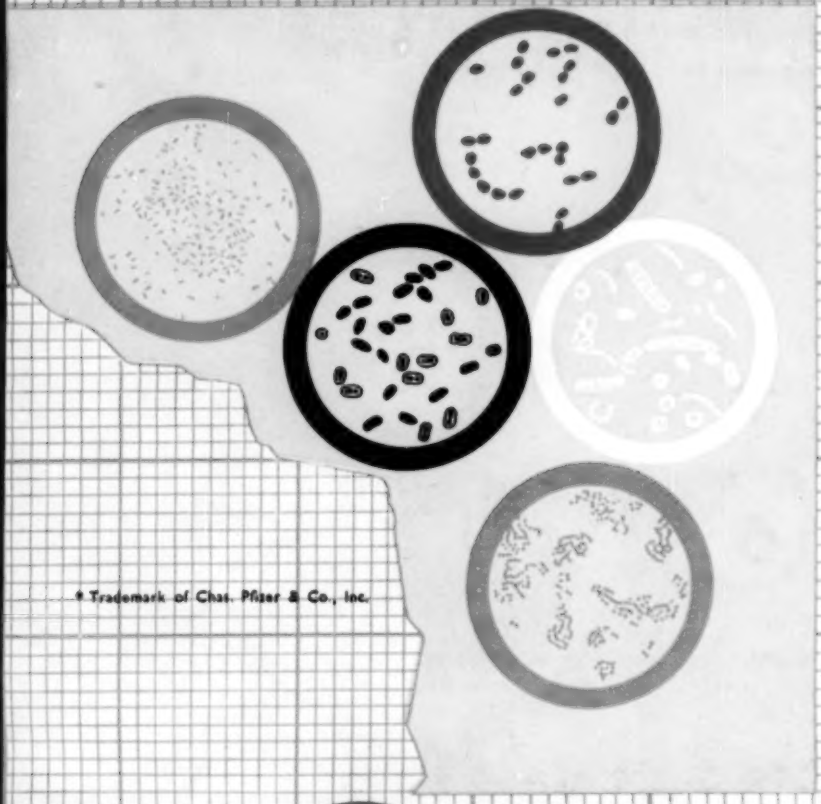

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